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TEXT-BOOK OF MIDWIFERY FOR NURSES

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Nov. 16
THE BOSTON
Rec'd Nov. 3, 1906.
Medical and Surgical
JOURNAL.
Nov. 23.

PRACTICAL TEXT-BOOK OF MIDWIFERY

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OF

MIDWIFERY

FOR

NURSES

BY

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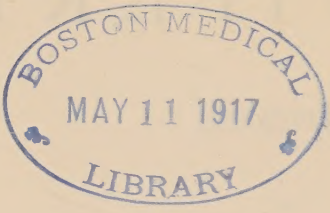
WITH FORTY-NINE ILLUSTRATIONS

THIRD EDITION

LONDON:
HENRY KIMPTON
13 Furnival Street, Holborn, E.C.
GLASGOW: 40–42 University Avenue
1906

W. T. KEENER & CO.,
CHICAGO.



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TO

THE MATRON OF THE GLASGOW MATERNITY HOSPITAL

AND TO THE

NURSES OF THAT INSTITUTION

I DEDICATE THIS BOOK IN RECOGNITION OF THE

ZEAL AND DEVOTION WITH WHICH THEY

PERFORM THEIR DUTIES.

ROBERT JARDINE.

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PREFACE

This book is based on the lectures I have been in the habit of delivering to the nurses in the Glasgow Maternity Hospital. While it is primarily intended as a text-book for them, it is hoped that it may be of use to others, and also to students, especially to those who take out their cases before they have had lectures on midwifery.

After a very extensive experience in both antiseptic and aseptic methods in midwifery work, I have no hesitation in stating that the latter gives the better results. I have therefore attempted to lay down strict rules for its observance. The treatment of the patient during the puerperium is largely in the hands of the nurse. If she is careful in carrying out her instructions properly, no blame can be attached to her if things go wrong. In my teaching I have always tried to bring this truth home to nurses, and to impress upon them that their responsibility in regard to the well-being of their patient is very great.

I have gone pretty fully into the difficulties to be met with; some may say too fully, but I do not think so. The more a nurse knows about the difficulties of midwifery work, the less likely is she to allow her cases to drag on until they are beyond hope, before she sends for skilled assistance. Midwives are a very old institution, and are likely to continue in existence as long as the poor are with us. Those of us who have to teach them must endeavour to make their training as thorough and practical as possible.

I am deeply indebted to Drs. W. S. Playfair, J. Halliday Croom, and W. E. Fothergill, for their kindness in allowing me to use so many of their illustrations. To Dr. John Lindsay also my best thanks are due for the beautiful drawings he has made for me.

R. J.

Glasgow, *October*, 1899.

PREFACE TO THE THIRD EDITION.

A full description of inspection and palpation of the abdomen will now be found in the chapter on the management of a Normal Labour. I have also illustrated the method of supporting the perineum. In all, ten new illustrations have been added. I am indebted to Messrs Rebman for permission to reproduce Figs. 16, 17, 18, 19, 20, 22, 23, 25, 44, 47, 48, and 49 from my work on Clinical Obstetrics.

R. J.

20 Royal Crescent, Glasgow, W.
1906.

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INTRODUCTION

Not so many years ago any woman who had had a number of children herself considered that she was thereby qualified to attend confinements. Among the poorer classes one still occasionally comes across such a "handy" woman or "howdie" as she is styled in Scotland, but she is gradually vanishing, and it is to be hoped that she will ere long become as extinct as the sick nurse of the type of Sarah Gamp.

Within recent years the nursing of the sick has been placed upon a scientific basis. The course of training for medical and surgical nursing usually extends over a period of three years. To the training of midwives, unfortunately, only as many months are usually devoted; yet, a midwife who attends cases alone, undertakes a much graver responsibility than any medical or surgical nurse who never works except under the directions of a doctor. The time spent in obtaining experience in midwifery nursing is far too short.

Any woman who undertakes the duties of attending confinements, either in the capacity of a midwife or of a monthly nurse, incurs a grave responsibility. The comfort of the mother and child depends upon how she fulfils her duties, and, in the event of any neglect, the consequences may be very serious, nay, even fatal. The monthly nurse has a doctor to look to for counsel and guidance, and it is her

bounden duty implicitly to obey his orders. If she does so, and anything goes wrong, she cannot be blamed, but if she is foolish enough to attempt any treatment on her own account, she must be fully prepared to bear the responsibility. It cannot be too strongly urged upon a monthly nurse that, as she is continually with her patient, she must ever be on the watch for any complication, and must at once report any such to the doctor. Any delay in observing or reporting complications during labour or the lying-in period may be fraught with terrible consequences to the patient.

A midwife attending cases alone occupies practically (so long as everything goes right) the same position towards her patients as a doctor does towards his. If any serious complication arises during labour or the lying-in period, she must not undertake the responsibility of dealing with it herself, but must send for medical assistance at once. If she does not, and the patient dies, she will have placed herself in a very awkward position, which may end in a criminal charge against her. Her responsibilities are very grave, and the sooner she recognises this the better for her patients and for herself.

The duties of a nurse are so arduous and trying that no woman should undertake them unless she is strong, both bodily and mentally; she should always have her nerves under control. A woman of a hysterical tendency who cannot keep a firm control over herself should never undertake nursing. A nurse should always treat her patient with kindness and yet with firmness. Her work should be done quietly and without any fuss, and, however much her patience may be tried, she should never lose her temper.

The subject of puerperal or child-bed fever will be dealt with later on, but it cannot be too soon or too often impressed upon a nurse that this disease is a preventable one, and that the prevention of it lies in absolute or surgical cleanliness. The first and most important lesson a nurse has to learn is, what is meant by surgical cleanliness or asepsis, and how she may keep herself and her patient aseptic. If she fails to grasp that principle, she will never be a success—while, on the other hand, if she carries it out fully, she may confidently expect good results.

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CHAPTER I.

THE BODY CAVITIES, SYSTEMS, ORGANS, AND THEIR FUNCTIONS.

We cannot enter into a full discussion of the different parts of the body, but it is necessary that a nurse should have a slight knowledge of the different systems and what their functions are.

Roughly speaking, the body is made up of a bony framework, the skeleton, clothed with muscles, which again are covered over with skin. Throughout the skin there are immense numbers of sweat glands, which, by their action, get rid of a considerable amount of fluid from the body, and help to rid it of several substances which would be poisonous if retained. The skin, therefore, should be kept clean, so that these glands may act freely, especially during pregnancy.

The **body** consists of a head, neck, trunk, and a pair of upper and lower extremities, *i.e.* arms and legs. There are four main cavities, in which lie many important organs, viz.: the skull or cranial cavity, the chest or thoracic cavity, the belly or abdominal cavity, and the pelvic cavity. Within the skull lies the brain. In the adult, the bones of the skull are firmly united together, and form an admirable case or protection for the brain; but in the new-born infant they are not firmly united, and allow of the head changing its shape. Continuing down from the brain we have the spinal cord or marrow, which lies inside the bones of the spinal column. The spinal column consists of a large number of bones, called vertebræ, bound

together, one on the top of the other, by strong ligaments. The lower vertebræ are modified in shape, and go to form the back part of the pelvis. The nerves from the brain come out through various small holes or foramina in the skull, and those from the spinal cord also pass through openings between the various vertebræ. They run to the muscles and different organs, and impulses of various kinds are conveyed backwards and forwards along them, somewhat in the way electricity is conveyed along wires in telegraphing.

Cavities of the Body.

In the skull or cranial cavity, as we have already seen, the brain lies. The cavity of the chest or thorax is protected by the 12 pairs of ribs which arch round from the back-bone behind, and 10 pairs are joined to the breast-bone or sternum in front by pieces of cartilage. The last two pairs are called floating ribs, as they are not joined to the breast-bone by cartilage. The chest cavity is shut off from the belly by a muscular partition called the diaphragm. In this cavity lie very important organs, viz.: the heart with its large vessels, and the lungs; the gullet, blood vessels, thoracic duct, and nerves also pass through it.

The **lungs** are the organs which purify the blood, while the heart is the force pump which sends it to all parts of the body. Leading down to the lungs from the back of the mouth we have the trachea or windpipe. The rings of cartilage which form the hard part of its wall can easily be felt in the neck, lying in front of the gullet. In the chest the trachea divides into two branches, one to each lung, and each of these branches or bronchi divides again and again in the lungs, much like the branches of a tree, until it ends in small air cells. From the heart a large artery runs to the lungs and divides up in the same

way until it ends in minute twigs or capillaries in the walls of the air cells. The blood is conveyed from the heart to the lungs by this artery, and it runs back to the heart through capillaries and minute vessels, which increase in size and run together into two pairs of large vessels or veins. The pure air we draw in with each breath passes down to the minute air cells through the various branches of the bronchi, and it gives up to the blood its oxygen, while, at the same time, the blood gives off impurities, such as carbonic acid, etc., to the air. The air and the blood do not mix, as there is always a thin membrane between them, but oxygen has the power of passing in through this membrane, and carbonic acid, etc., can pass out. It is in this way that the blood gains its oxygen, which is necessary for life, and also gives off impurities, such as carbonic acid. That the air we breathe out is impure, can easily be shewn by blowing it into some lime water through a glass tube, when the lime water will at once become milky looking, from the carbonic acid forming carbonate of lime. In the same way, if you blow it into a solution of Condy's fluid, the fluid soon becomes very dark in colour, shewing that there are impurities in it besides carbonic acid. If many people are shut up in a close room, the air after a time will become very impure, and unless fresh air is allowed to enter all its oxygen will become exhausted. The Black Hole of Calcutta, where so many perished, is a terrible example of the danger of under ventilation. It is obviously important to see that a room is well ventilated, especially in times of sickness, in order to allow of a free supply of pure air for the inmates.

The **heart** lies between the two lungs, a little to the left side. The apex or part you can feel beating, lies a little below the left nipple. The heart is practically a double organ, with a right and left half, and each half has two cavities, an auricle and a ventricle. The right side contains

impure blood, and the left pure. If we trace the circulation, we find the impure blood comes from all parts of the body into the right auricle, and then passes on into the right ventricle, which sends it to the lungs through the bronchial artery. It is purified in the lungs, and then comes back to the left auricle through the two pairs of pulmonary veins. From the left auricle it passes into the left ventricle, and is then sent on through the large artery or aorta, from which it is distributed to the various organs and muscles of the body. The various arteries throughout the body carry the pure blood to its ultimate destination. The arteries get smaller and smaller, and end in minute capillaries; as the blood passes through these it gives off its oxygen and nourishment to the tissues and takes up impurities. It returns to the heart, first through minute capillaries, which gradually increase in size and join together to form veins. All arteries, except the pulmonary, carry pure blood, and all veins, except the pulmonary, impure. The arteries have no valves in them, but the veins have. These valves help to support the blood and to assist the circulation; but if the veins become distended, as those in the legs often do during pregnancy, the valves are of no use, and we have a condition known as varicose veins.

With each contraction or pulsation of the heart, the blood is forced along the arteries in waves. These waves or pulsations can be felt in any superficial artery of a fair size, and give what is known as the **pulse.** The most convenient place to feel the pulse is at the wrist, on the thumb side of the arm. The radial artery there lies quite near the surface, and has a bone behind it which makes it easily felt. The ordinary rate of pulsation in a healthy adult is about 72, but any excitement, active exercise, or feverishness will increase it markedly. If an artery is cut, the blood will spurt out in jets with each pulsation—it will

be crimson in colour. On the other hand, if a vein be severed, the blood will flow out steadily, as there is no pulsation in the veins—the blood will be dark in colour, *i.e.* it is impure blood.

This is a convenient place to speak of the **body heat** or **body temperature.** It is measured by a clinical thermometer which may be placed in the armpit, mouth, or rectum. The normal temperature is 98·4° F., usually marked on the thermometer by an arrow. In taking a temperature, the mercury in the thermometer must always be shaken down below normal (98·4°), the armpit should then be dried thoroughly, and the bulb of the instrument should be placed well in, so that no clothing comes between it and the skin. The arm should be folded over the chest. An ordinary thermometer should be left in for 10 minutes, but half-minute and one-minute ones are now used. They, however, should be left in until the mercury stops rising. In many cases it will take five minutes. When taken in the mouth, the clean thermometer should be placed under the tongue, and the lips closed on it; warn the patient not to grasp it with the teeth as it is easily broken. If, however, such an accident should happen, and the mercury be swallowed, it will do no harm. In the mouth, the temperature is usually slightly higher than in the axilla. There may be one degree in difference; therefore the temperature should be always taken in one place in the same patient.

During the child-bed period, the temperature should remain about normal, but it may rise to 100° without there being anything seriously wrong. If it rises over 100°, the nurse must let the doctor know at once. When the temperature rises, the patient is said to be in a state of fever or pyrexia, and this condition must always be looked upon with suspicion and steps be promptly taken to check it, for fear of it ending in puerperal fever. There

are many causes of rises of temperature during the child-bed period, which will subsequently be dealt with. A temperature of 105° is a very serious matter. This condition is known as one of hyperpyrexia. The pulse rate usually rises with the temperature. A very low or subnormal temperature, say of 96°, is also a very dangerous condition. The patent will then be in a condition of profound collapse or shock: after severe operations or severe bleedings this is seen. It is a very dangerous condition if it persists for any length of time. It is not uncommon to find a subnormal temperature of 97° or 97.5° during the puerperium, but this is of no consequence provided the pulse is all right. Very high and very low temperatures, then, indicate danger.

The Cavity of the Belly or Abdomen.

This is the largest cavity in the body. It lies immediately below the chest cavity, from which it is separated by a muscular partition known as the diaphragm or midriff. It has no bones at the sides or in front, but these walls are made up of powerful muscles which play an important part in labour There are many important organs in the abdominal cavity, viz.:—the stomach, liver, spleen, bowels, pancreas, and kidneys. Besides these, there are large arteries and veins, nerves, lymphatic glands, ducts, etc. In the latter half of pregnancy the womb lies in it. The inside walls are lined with a smooth glistening membrane which also covers all the organs. This is known as the peritoneum. The abdominal cavity is often spoken of as the peritoneal cavity. This lining is very liable to become inflamed (peritonitis), and in bad septic cases the disease is usually fatal.

We shall now consider very shortly the functions of the more important organs in the abdomen.

Digestive System.

The abdominal organs concerned in digestion are the stomach, bowels or intestines, the liver, the pancreas, and the glands behind the bowels.

The various forms of food we eat have to be changed into a condition in which they can be absorbed or can pass through an animal membrane. Solids cannot do this, therefore they must be dissolved. Neither can starch or fat, the starch must first be changed into sugar, and the fat must be formed into an emulsion. When food is taken into the mouth, if it is solid, it is first crushed between the teeth, and while this is going on, it is thoroughly mixed with saliva from the salivary glands in the floor of the mouth. In the saliva there is a ferment which has the power of changing starch into sugar. The digestive process you see begins in the mouth. The food passes on through the gullet or œsophagus into the stomach, where it is thoroughly mixed with the gastric or stomach juices. The gastric juices, of which pepsin and hydrochloric acid are the chief ingredients, are secreted by numerous glands in the lining of the stomach, which become very active when the food passes in. The food remains in the stomach for some time, and some absorption takes place there, but the main portion of it passes on into the intestines. Into the first part of the intestine, the duodenum, there are two ducts opening: one of them brings bile from the liver, and the other, the secretions from the pancreas. The bile acts on the fat in the food and changes it into a soap or an emulsion, while the pancreatic secretions act on the starch which has not already been changed into sugar, and on the other ingredients of the food, to render them fit for absorption. There are also intestinal juices from various glands in the walls of the intestines which assist in the changes. As the food passes on through the

intestines, the nutrient portion of it is absorbed by projections on the lining of the intestine, and passed on to the glands which lie behind the intestines, where it is further elaborated and carried through a duct which runs up through the chest cavity, the thoracic duct, to open into one of the large veins in the neck. The refuse portion of the food passes on down through the intestines, and is cast out when the bowels move.

The **liver** is the largest organ in the body. It lies immediately under the diaphragm at the right side, but part of its left lobe projects beyond the middle line. The edge of it is just under the ribs. Its chief function is to secrete bile. Under its edge can be seen a small bag or bladder, the gall bladder, in which surplus bile is stored. The bile is conveyed to the intestines through a duct which opens into the first part of the small intestine. In rare cases the liver becomes very seriously diseased in pregnancy (acute yellow atrophy), and causes death very quickly. Tight lacing has a very bad effect on the liver, and may deform and displace it seriously.

The **pancreas** is a small elongated organ which lies across the abdomen, below the stomach. Its function is to secrete digestive ferments which are poured into the small intestine through a duct.

Urinary System.

The **kidneys** lie one on either side of the back-bone, with their upper ends just below the ribs. Their function is to clear the system of surplus water and various poisonous substances. If they do not act well, the person soon begins to suffer. As the urine is excreted by them it passes down through a tube from each, known as the ureter, to the bladder, where it is stored. From time to time the bladder is emptied by the urine being expelled

through the urethra, which opens externally in the vulva. In pregnancy, the kidneys have extra work to do, as they have to purify the mother's blood from its own impurities, and also from those of the fœtus. If they are not equal to this, serious consequences arise, as we shall see later on.

The **spleen** lies under the ribs of the left side just below the diaphragm. It is a blood-forming gland.

The Cavity of the Pelvis.

Strictly speaking, this is merely the lower part of the abdominal cavity with which it is continuous. As it is the part of the body with which we have to deal particularly, the description of it and its important contents, the internal organs of generation, will be taken up separately.

CHAPTER II.

THE BONY PELVIS.

The only part of the skeleton which we have particularly to deal with in the mother is the **pelvis.** It is the basin-shaped arrangement of bones placed at the lower part of the trunk. It is continuous with the back-bone or spine, in fact the back part of it is made up of vertebræ or bones of the spine, somewhat modified in shape. The thigh bones are jointed to either side of it. In its cavity lie the internal organs of generation, the bladder, and rectum or lower bowel, and through it the child passes during labour. We must, therefore, carefully study its size and shape, so that we may thoroughly understand the movements of the child as it is being born.

In the adult the pelvis is made up of four bones, viz: two innominate bones, one on either side, while behind and between them lies the sacrum, with the 4th bone, the coccyx, attached to its lower end.

The Innominate Bone.

In the child each **innominate** bone consists of three separate bones, joined together by cartilage; but in the adult, the cartilage joining the three bones has been ossified or changed into bone, so that the three bones have become one. Although it is one bone, it is described as three, viz: the ilium, the ischium, and the pubis.

The upper flattened somewhat saucer-shaped portion is the **ilium.** The two form the wings, as it were, of the

pelvis. The upper border or crest is curved, and ends in front in what is called the anterior superior spine. Lower down in front is another projection, the anterior inferior spine. The inner surface is smooth and hollowed out, forming the iliac fossa. At the back part is a somewhat roughened ear-shaped portion, the articular surface, which is jointed to a similar shaped portion at the side of the sacrum, forming the sacro-iliac joint.

The **ischium** lies below the ilium. It consists of a rough projection, the tuberosity, on which the body rests in sitting. Above and behind this is a smaller projection, the ischial spine. Running forwards from the tuberosity is the ramus, which unites with the descending ramus of the pubis to form one side of the pubic arch. The union of these two rami encloses a large opening, called the obturator foramen.

The **pubis** or share bone lies in front of the ischium, and joins with its fellow of the opposite side in a joint known as the symphysis pubis. The descending ramus or branch joins the ramus of the ischium, while the body of the pubis unites with the ilium and ischium in the acetabulum or socket of the hip. The pubic joint or symphysis completes an arch which is known as the pubic arch. Under this arch the child has to pass in delivery.

The **sacrum** is triangular in shape, broad and thick at the top, narrow and thin below, and curved forwards. It is attached to the last lumbar vertebra, and at first consisted of 5 separate bones. It is really made up of 5 vertebræ or spine bones, somewhat modified in shape and fused together. The upper part projects forwards and forms what is known as the promontory of the sacrum. You will notice a canal runs down through it, and that in front there are 4 pairs of openings. The openings allow of the passage of the nerves from the canal in which they lie. The back is rough, with projecting spines, correspond-

ing to those of the backbone. You also see 4 pairs of openings which transmit the posterior nerves. At each side there is an ear-shaped portion which becomes joined to a similar portion already described in the innominate bone. This junction forms the sacro-iliac joint. The sacrum is wedged in between the two innominate bones, and forms, as it were, the keystone of the arch.

The **coccyx** or tail bone is jointed to the lower end of the sacrum by a hinge joint, which allows it to swing back for about an inch as the child is being born. Sometimes this joint is so firmly united that movement is prevented. It will then obstruct labour, and is apt to be broken or fractured. The coccyx at first consisted of 4 separate bones. It corresponds to the tail bones of animals.

Joints of the Pelvis.

Sacro-iliac joint or synchondrosis.—The innominate bone of each side is jointed behind to the sacrum in the sacro-iliac joint or sacro-iliac synchondrosis right and left. This joint is very strong, but it allows of a small amount of movement in labour, as we shall see in speaking of labour in cases of contracted pelvis.

Symphysis Pubis.

In front the pubic bones of each side are joined together at the symphysis. This joint is practically immovable, but in labour it gives a little. In difficult labours it is sometimes torn through, and sometimes an operation is performed to open it and allow the bones to separate while the child is being delivered.

Sacro-coccygeal Joint.

The coccyx, as we have already seen, is attached to the lower end of the sacrum by a hinge joint, the sacro-coccygeal. It is the most movable joint in the pelvis.

Ligaments of the Pelvis.

The bones are held together by very strong fibrous bands or ligaments. Besides the ligaments of the joints, a very strong one, the great sacro-sciatic ligament, stretches from the back of the sacrum to the tuberosity of the ischium, and a smaller one, the lesser sacro-sciatic ligament, from the same place to the spine of the ischium. These strong bands help to form the side of the pelvis. The opening between the great ligament and the bone is known as the great sacro-sciatic foramen, while that between the two ligaments is the lesser sacro-sciatic foramen.

If we examine the outer wall of the pelvis, we notice a cup-shaped depression, into which the head of the thigh bone fits to form the hip joint. The ilium, ischium, and pubis, all unite in it. It is known as the acetabulum. At its lower edge is a notch which looks directly downwards when the person stands erect. In front of the acetabulum is the triangular opening, the obturator foramen. In the living person a fibrous membrane stretches over it.

False and True Pelvis.

Looking at the **pelvis** as a whole, we see that it is naturally divided into an upper and a lower portion by a line running round the top of the pubic bones, and continued back along the iliac bones to the top of the sacrum. This is known as the ilio-pectineal line. Together with the top of the sacrum it forms the brim or inlet of the pelvis. All above the brim is known as the false pelvis, and all below as the true pelvis. It is with the latter we have especially to deal.

The true pelvis.—It is divided into a brim, a cavity, and an outlet. The brim is heart-shaped and is bounded

by the ileo-pectineal line on each side and the top of the sacrum behind. The outlet is lozenge or diamond-shaped, and is bounded in front by the lower border of the symphysis pubis, at each side by the tuberosities of the ischia and the sacro-sciatic ligaments, and behind by the tip of the coccyx. The cavity is the part which lies between the brim and the outlet. It is bounded in front by the symphysis pubis, at each side by the inner surface of the ischium, and behind by the front of the sacrum. The front wall is short, while the back one is much longer and is curved forward.

Soft Tissues of the Pelvis.

The sides of the **pelvis** have a number of muscles attached to them, and these, together with fascia and fat, etc., lessen the size of it; but as they are soft and compressible, they do not hinder labour much. The outlet is closed in by a number of muscles, which, with their sheaths, form what is called the floor of the pelvis. In this floor there are two openings. The front one is the vagina, and the back one the anus or opening of the lower bowel. Between these two openings lies a triangular-shaped body called the perineum.

Diameters or Measurements of the Pelvis

By a diameter of the pelvis is meant the distance between two given points on opposite sides.

External diameters.—The external diameters can only be taken by means of a special instrument, a pair of callipers. The most important external diameters are the inter-cristal—the distance between the widest part of the iliac crests; the inter-spinous—the distance between the anterior superior spines; and the

antero-posterior or external conjugate, — the distance between the tip of the last lumbar vertebra and the front of the symphysis pubis. The latter diameter is of very little importance. The inter-cristal diameter should be about 11 inches, and the inter-spinous about 10 The length varies somewhat, but in a properly shaped pelvis there should be about 1 inch difference between them. *i.e.* the inter-cristal should be an inch longer than the inter-spinous diameter.

Internal diameters.—These are taken at the brim, in

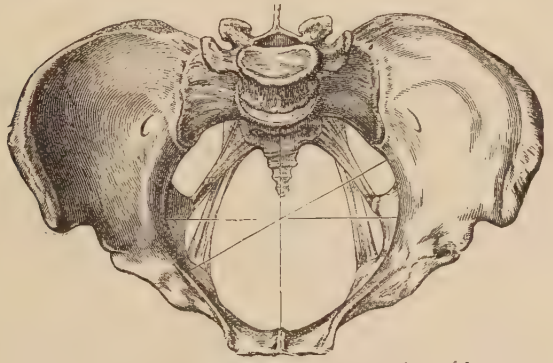

FIG. 1.—Brim of pelvis showing the conjugate—oblique and transverse diameters. (Playfair.)

the cavity and at the outlet. They are four in number, viz., the antero-posterior or conjugate, two obliques (right and left), and the transverse.

At the brim the antero-posterior or conjugate is measured from the centre of the top of the sacral promontory to the centre of the top of the symphysis pubis (4 inches).

The right oblique is measured from the right sacro-iliac joint to a small elevation, the pectineal eminence, situated on the left ileo-pectineal line, at the point where the ilium and pubis join. The left is measured from the left sacro-iliac joint to the right pectineal eminence. They measure $4\frac{1}{2}$ inches. As a matter of fact, the right is

slightly longer than the left, but the difference is very slight.

The transverse is measured from the middle of the brim of one side to the same point on the other side (5 inches).

The same measurements can be taken in the centre of the cavity. They are all equal ($4\frac{1}{2}$ inches).

At the outlet the antero-posterior is measured from the tip of the coccyx to the under edge of the symphysis pubis (5 inches).

There is no fixed point of bone from which to measure the obliques, but they may be put at $4\frac{1}{2}$ inches.

The transverse is measured from the back part of one ischial tuberosity to the same point on the other (4 inches).

The following table will enable you to remember these figures easily. These diameters are slightly less than the ones usually given. They represent the smallest normal pelvis. Anything less than these shew that the pelvis is a contracted one.

	Conjugate.	Obliques.	Transverse.
Brim,	4 inches.	$4\frac{1}{2}$ inches.	5 inches.
Cavity,	$4\frac{1}{2}$,,	$4\frac{1}{2}$,,	$4\frac{1}{2}$,,
Outlet,	5 ,,	$4\frac{1}{2}$,,	4 ,,

You will notice that the smallest diameter at the brim, the conjugate, becomes the largest at the outlet, while the largest at the brim, the tranverse, becomes the smallest at the outlet. The obliques remain the same throughout.

Planes of the Pelvis.

A **plane** is an imaginary flat surface. If you were to place a saw on the ileo-pectineal line and cut right back through both iliac bones, following the line all the way right back to the top of the promontory, the saw would pass along the plane of the brim. Or if you cut a piece of paper the exact shape of the brim, and place it in

the brim, it would lie exactly in the plane of the brim. If hundreds of these sheets of paper were placed in the cavity, they would represent the different planes, and in the same way one in the outlet would represent the plane of the outlet. The plane of the outlet is not parallel to the plane of the brim, because the tube or cavity of the pelvis is not a straight one, the back wall being very much longer than the front one.

The Axis of the Pelvis.

By an axis to a plane we mean a line drawn at right angles or perpendicular to the centre of the plane. The axis of the brim, then, is a line drawn at right angles to the centre of the plane of the brim. This is the direction that the presenting part of the child must follow as it enters the brim. In the living person the direction of the axis of the brim is represented by a line drawn

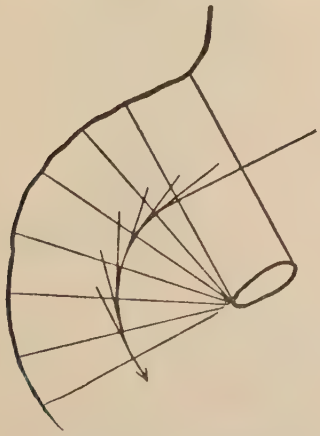

Fig. 2.—Diagram of a Simple Construction for the Pelvic Axis. (Fothergill.)

from the navel to the tip of the coccyx. To get the axis of the pelvis it would be necessary to draw a very large number of lines at right angles to the centres of the different planes, and then to join these points. The result would be a curved line. Taking the plane of the outlet as extending from the lower border of the symphysis to the tip of the coccyx, its axis would be represented by a line drawn from the promontory directly downwards. The vulvar opening lies considerably in front of this, and its axis runs very much further forward. The axis through which the child has to pass is thus seen to be first downwards and backwards, then downwards and finally forwards. This curved axis is known as the curve of Carus. It is of the utmost importance to remember that the axis is curved when assisting delivery, so that traction may be made in the right direction.

Difference between the Pelvis of a Male and a Female.

There is considerable difference between the two, so that it is possible to decide whether a pelvis has belonged to a man or a woman.

The principal points are that in the female pelvis the bones are lighter and smoother, the iliac bones more spread out, the cavity shallower and more capacious, the outlet larger, the tuberosities of the ischia further apart, the pubic arch much wider, and the promontory of the sacrum projects less than in the male. The female pelvis will thus be seen to be better adapted for the passage of a child through it than the male. Occasionally we find a female pelvis very like a male one. This is sometimes called a funnel-shaped pelvis. The labour in such a pelvis is likely to be difficult,

CHAPTER III.

FEMALE ORGANS OF GENERATION.

The **organs of generation** in the female are divided into external and internal. The vaginal canal may be said to connect the two. The external ones lie outside the pelvis on the surface of the body, while the vagina and internal ones lie within the cavity of the true pelvis.

Fig. 3.—External Genitals of Virgin, with Hymen. (Sappey.)

a. Labium Majus.
b. Labium Minus.
c. Prepuce of the Clitoris.
d. Glans of the Clitoris.
e. Vestibule, just above the Urethra Opening.
f. Mons Veneris.

Collectively, the external organs are known as the pudenda or vulva (Fig. 3), and are made up of the mons veneris, the labia majora or greater lips, the labia minora

or lesser lips, the clitoris, the meatus urinarius or opening of the urethra, the hymen when present, or its remains, the carunculæ myrtiformes, the fourchette, and the orifice of the vagina.

The **mons veneris,** which is usually covered with hair in the adult, lies immediately over the symphysis pubis. Running down from it on each side of the opening of the vulva, are the two larger lips or **labia majora.** They meet behind in the posterior commisure or fourchette. They consist of skin, and their outer surfaces are covered with hair. Beneath the two larger lips, and entirely concealed by them in young women, are the two lesser lips or **labia minora** (also known as the **nymphæ**). They join together in front and go to form part of a small elevation known as the **clitoris.** Below the clitoris, and bounded on each side by the labia minora, is a smooth triangular space called the **vestibule.** In the centre of the base of this space and about one inch below the clitoris, is the opening of the urethra or the **meatus urinarius.** This opening is immediately under the symphysis pubis, and its exact position must be carefully borne in mind by the nurse, to enable her to pass a catheter in the manner to be described later on. The lower edge of the vestibule forms the upper boundary of the vaginal opening. In virgins this opening is generally partially blocked by a fold of mucous membrane called the **hymen.** In the centre of the hymen there is usually an opening through which the monthly discharge can escape. In rare cases there is no opening. In such a case, when the monthly periods begin, the discharge cannot get away, and it is retained, first in the vagina until it is full, and then in the womb itself. It is a serious condition unless relieved by an opening being made through the hymen. This is not a case for a nurse to deal with. The hymen is usually torn during the

first act of connection, but this may not happen, as we occasionally find it present at labour. It may form an obstruction to the passage of the child and require to be removed. In some cases there is no hymen present, so that its absence may not prove that the woman is not a virgin, while on the other hand its presence cannot be taken as proving absolutely that she is a virgin. In some cases it is thick, and when ruptured may bleed profusely. In a woman who has borne children, the remains of it may be seen in a few fleshy projections at the vaginal opening called the **carunculæ myrtiformes**.

If we draw back the fourchette we find a boat-shaped cavity between it and the back part of the hymen. This is known as the **fossa navicularis.** It is not seen after the first child is born, as the fourchette is then ruptured.

The **fourchette** forms the front edge of a triangular body which lies between the anus and the vagina, filling in the space between the vagina and the lower end of the bowel. This is known as the **perineum,** and forms an important part of the floor of the pelvis. It is about $1\frac{1}{2}$ inches long, but when the child's head is being expelled it stretches very much. In first full time labours the fourchette is always torn. The perineum itself may be torn in any labour, usually in part only, but occasionally right back into the bowel.

Immediately behind the perineum is the anus, or opening of the rectum or lower end of the bowel. The veins round the anus are very frequently distended or varicose, forming a condition known as piles or hæmorrhoids.

The **vagina** is the tube or canal which connects the external with the internal organs of generation. It is a muscular tube lined with mucous membrane. It is not a wide open tube as many diagrams would lead you to suppose. Its walls lie together, except when

something is passed between them. The direction of it is backwards and upwards. The posterior wall is much longer than the anterior. The narrowest part is at the external opening, and the widest at the upper end. The lining membrane can be seen and felt to be thrown into ridges or folds (rugæ), which by unfolding allow of the great distention which is required as the child passes through it.

FIG. 4.—Saggital Section of Pelvic Organs. (Fothergill.)

The **womb** or **uterus** is situated above the vagina. The neck of the womb pierces the anterior vaginal wall, near its upper end, and the vaginal portion of the neck or cervix is felt projecting slightly into the canal. In front of the cervix a space is felt, known as

the anterior fornix, and behind it there is a much larger one, known as the posterior fornix. In front of the vagina we have the urethra, part of the bladder, and the symphysis pubis, while behind it lie the perineum, rectum, and sacrum.

The vagina, then, forms the avenue of entrance to the uterus, through which (1) discharges from the uterus come (2), conception takes place (3), the child is born.

The uterus.—The uterus or womb lies above the vagina, in the cavity of the true pelvis. In front of it is the bladder, while behind is the rectum. It is somewhat of the shape of a flattened pear lying with the big end

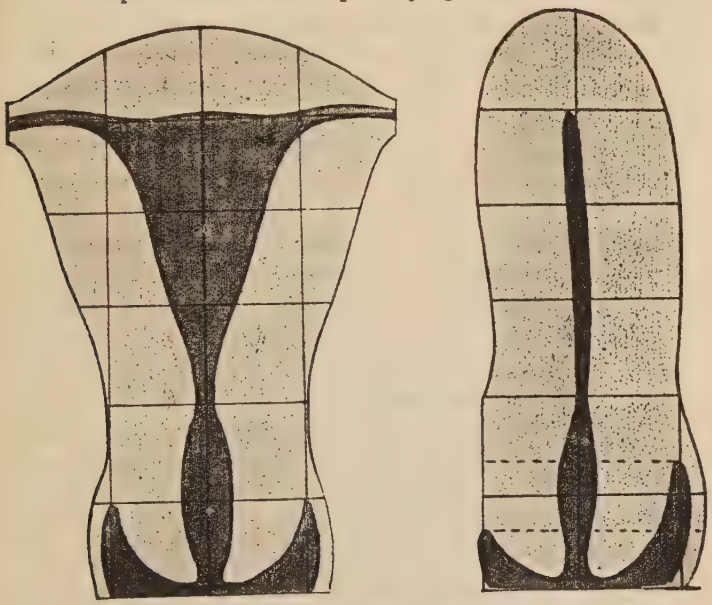

FIG. 5.—A Coronal, and B, Sagittal sections of Uterus drawn over ½ in. squares to show dimensions of the organ. (Fothergill.)

upwards. In the unimpregnated condition, the length is about 3 inches, the breadth 1½ inches, and the thickness

1 inch, while it weighs a little over an ounce. The cavity is $2\frac{1}{2}$ inches long.

The uterus may be divided into two portions: the body, and the cervix or neck. The upper $1\frac{3}{4}$ inches is the body, and the lower $1\frac{1}{4}$ inches the cervix. The rounded upper part of the body is the fundus. The cervix or neck, as has already been stated, pierces the anterior wall of the vagina, and a very small part of it lies in the vaginal canal.

The walls of the uterus consist of three coats. The inner coat, or lining of the cavity, is the mucous membrane or endometrium, the middle coat, which forms the greatest portion, is the muscular, while the outer coat is the serous or peritoneal covering. The mucous coat or lining is much the same as the mucous membrane lining any of the other cavities of the body, such as the mouth or stomach. There are a large number of glands in it which secrete mucus. We shall see afterwards how this coat changes at each monthly period, and also when conception takes place. Like other mucous membranes, it will quickly absorb any substance applied to it, so that, if any dirty or septic substance gets into the uterus, blood-poisoning to a greater or less degree will result. In the cervix the mucous membrane is arranged in branching folds, called the **arbor vitae.**

The muscular coat consists of muscular fibres arranged in different directions. Some run up and down over the fundus, and these, by their contractions, help to open the mouth of the womb and expel the child. Others are interlaced in all directions around the blood-vessels, and these, by their contractions, close up the vessels and prevent bleeding after the child is born. Others again, are arranged in a circular manner round the openings of the uterus.

The serous coat or peritoneal layer covers over the

uterus. It is the same as, and continuous with, the lining of the abdominal cavity. At each side of the uterus, it passes out to the side wall of the pelvis, forming what are known as the broad ligaments of the uterus. These broad ligaments serve to steady the uterus in the pelvic cavity. There are two muscular ligaments, the round ligaments of the uterus which run between the folds of the broad ligament, one from either corner of the fundus, down towards the top of the pubes, where they pass out through a small canal to become attached under the mons veneris and labia majora. In labour they can easily be felt as rounded cords. Where the peritoneum passes back from the bladder on to the uterus, two folds, called the utero-vesical ligaments, are formed, and behind, where it passes off the back of the uterus to cover the rectum and become attached to the sacrum, we have two others, the utero-sacral ligaments. The space between the back of the uterus and the rectum is known as the **pouch of Douglas.**

Openings into the uterine cavity.—In the vagina we have the lower opening of the cervical canal. In a nulliparous woman, *i.e.*, one who has never borne children, this is a small slit; but in a woman who has had children, it is much larger, and may admit the tip of the finger easily. In these cases the edges of it are usually torn. It is known as the external os, or the **os externum,** that is the external mouth. At the upper part of the cavity of the cervix is the internal opening or the **os internum,** which opens into the cavity of the uterus proper. The cavity of the cervix is spindle-shaped. The cavity of the uterus is triangular in shape with the base of the triangle upwards. At each corner of the upper part or fundus we find two small openings which will admit a bristle. These are the openings of the Fallopian tubes, right and left. We thus have three

openings into the cavity of the uterus, below, the os internum, and above at each corner, that of a Fallopian tube. It is through these minute openings of the tubes that the ova or eggs get into the uterus.

The **Fallopian tubes** are two small tubes, one at either side of the fundus of the uterus, which run out towards the sides of the pelvis. They lie between the folds of the broad ligaments, just in the same way as a clothes line lies between the folds of a sheet thrown over it. They are from 3 to $4\frac{1}{2}$ inches in length. The outer end of each is twisted round towards its ovary, and ends in a trumpet-shaped mouth, surrounded by a fringe of small projections, called the fimbriated extremity of the tube. The ovum or egg (of which we shall speak immediately), when it leaves the ovary passes into this open mouth, and travels along the tube to the uterine cavity. Each tube has the same coats as the uterus, viz., a mucous, continuous with that of the cavity, a muscular, and a serous coat. The muscular coat is very much thinner than that of the uterus. At the outer end the cavity of the tube is much greater than at the uterine end.

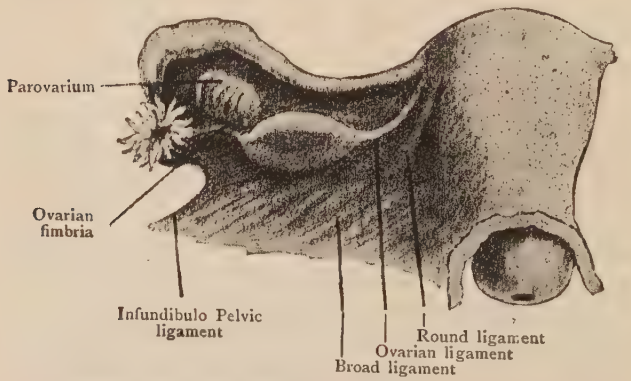

FIG. 6.—Uterus from behind, with left tube and ovary. (Fothergill.)

The **ovaries** are two somewhat oval bodies, fully an inch long and half-an-inch thick. They lie one on either side of the fundus, on the back of the broad ligaments, a little below the Fallopian tubes. The inner end of each is attached to the fundus by a ligament a little over an inch long, and the outer end to the fimbriated end of the Fallopian tube. They are the organs in which the ova or eggs are developed, and correspond to the testicles of the male. The ova or eggs are very numerous in them, and as they ripen, they come to the surface, and the little sacs in which they are contained burst and allow them to pass into the Fallopian tubes and on into the uterus. If one, or it may be two of them, are impregnated by the male elements or spermatozoa, development at once begins, but the vast majority of them perish and escape in the uterine discharges. The little sacs from which they escape fill with blood, and healing quickly takes place; but if impregnation occurs, this little sac forms a yellow body known as the **corpus luteum,** about the size of a bean. This corpus luteum does not disappear until some time after delivery, so that if the woman dies during pregnancy or shortly after delivery, by examining the ovaries one can tell from which one the ovum which was impregnated came. The ovaries in a young girl are quite smooth, but in an elderly woman they are puckered and shrunken, shewing small scars where the ova have been discharged.

The parovarium or organ of Rosenmüller, is really not an organ of reproduction. It lies in the broad ligament between the ovary and the Fallopian tube, and consists of a number of closed tubes. It is the remains of a fœtal structure. Tumours sometimes develop from it (parovarian tumours).

Blood supply of the uterus and ovaries.—They are richly supplied with blood on either side by two arteries

which run into the uterus between the folds of the broad ligament. The upper one, the ovarian artery, goes to the ovary, and then on to the fundus of the uterus which it supplies, running down to join with the lower one, the uterine artery, which comes in lower down. The arteries in the body of the uterus are very twisted in arrangement, known as the curling arteries. The arrangement of the uterine muscular fibres round about them helps to close them up when the child is born, so that bleeding in most cases is quickly checked. There is also an arrangement of veins which carries the blood back towards the heart. This copious blood supply to the uterus is necessary both for its great growth during pregnancy and also for the wants of the child.

The **mammary glands** or breasts are not organs of reproduction, but they are so intimately connected with them that we may conveniently describe them now. Their function is to secrete milk for the nourishment of the child during the first ten or twelve months after birth.

The **mammæ** or breasts are usually two in number, but sometimes there are more. They are placed one on each side of the chest over the front of the third, fourth, fifth, and sixth ribs. They are made up of gland tissue and ducts with considerable fat. In the young girl they are small, but when menstruation begins they increase considerably in size, and during pregnancy there is a marked growth in them.

About the centre there is a raised projection, the nipple, or teat. All the ducts in the breast converge towards the nipple and open in minute holes in the top of it. It is well supplied with blood, and has the power of becoming erect when irritated. Round about the nipple is a ring, pinkish-coloured in blondes, and much darker in brunettes. This is the areola. It increases in size and becomes much darker in colour during pregnancy.

The gland tissue forms the milk, and it is conveyed along the ducts to the nipples, through which the child draws it. Milk is usually found in the breast during pregnancy. It is also sometimes found in the breasts of newborn infants, both boys and girls, and at times in the breasts of men.

There is an intimate connection between the uterus and the breasts through the nervous system, as can be seen by contractions being set up in the former when the child is suckling.

Some women have extra mammæ on some part of the abdomen, and it is not very uncommon to find extra nipples in the same position.

The breasts are sometimes very large and pendulous. Among some tribes of Africans they are so long that the child, carried on its mother's back, can take a drink by the breast being thrown up over the shoulder.

CHAPTER IV.

PUBERTY, OVULATION, AND MENSTRUATION.

At the age of **puberty,** 13 to 15, a growth of hair develops on the mons veneris, the external organs of generation become mature, and the internal ones take on the reproductive functions. The young girl develops into a woman, her breasts enlarge, and the pelvis increases in size. Ovulation and menstruation begin, and if sexual congress takes place the girl may bear a child.

Ovulation.—By the term ovulation is meant the ripening and escaping of an ovum or egg from the ovary. The sac or cell from which the ovum escapes is known as a Graafian vesicle or follicle. As we have already mentioned, this ruptured Graafian vesicle quickly heals up, merely leaving a little scar behind, but, if the ovum becomes impregnated, it forms into the corpus luteum or yellow body of pregnancy in the ovary, and does not disappear until some time after delivery. When the ovum is discharged from the ovary it finds its way into the Fallopian tube and passes on into the uterus. The vast majority do not become impregnated but are cast out in the uterine discharges. Where the spermatozoa or male elements meet the ovum is not definitely known. Some observers maintain that it is in the Fallopian tube, and there is no doubt that this does occur in cases of extra-uterine pregnancy, where the ovum develops in the tube, and not in the uterine cavity. The impregnation probably occurs in the uterine cavity in ordinary cases. The changes

which occur in the uterus and ovum in pregnancy we shall discuss in next chapter.

Ovulation begins at about the same time as menstruation. The two are intimately associated, but there is no doubt that ovulation occurs independently of menstruation, as pregnancy occurs sometimes before menstruation has come on, while it is in abeyance during suckling and also after it has ceased.

Menstruation.—By menstruation is meant a bloody flow from the uterus, recurring at monthly intervals. It is also called the menstrual flow, menses, or catamenia. When the flow is present, in ordinary language the woman is said to have her "monthly sickness," to be "unwell," "to alter," "to have her periods" or "courses."

True menstruation is peculiar to the human female and to monkeys. Many female animals, such as cows, bitches, etc., have a reddish discharge occasionally, but it comes from the vagina and not from the uterus.

Menstruation usually begins at puberty; about the age of 14 in this country. As we have already seen, ovulation begins about the same time. In health it should recur every month, except during pregnancy or suckling, until about the age of 45, when it ceases. This cessation is known as the "change of life," or **menopause.** At the commencement of the menstrual life the periods are apt to recur irregularly, and the same thing happens towards the end when the change of life is coming on. At both of these times the nervous system is in a very irritable condition. The onset is a somewhat critical time in the life of a young girl, and she should have great care taken of her. The menopause is not a particularly fatal time for women, no more die then than at any other time; but the nervous system is generally in an irritable condition for some time.

In this country menstruation begins about the age

of 14 to 15, but in warmer climates one or two years earlier, while in colder climates it is later. Among the rich it occurs earlier than among the poor.

Menstruation may cease from various causes, as in cases of consumption or anæmia (bloodlessness), but the most frequent cause of cessation is pregnancy. In some cases of pregnancy, however, it does not cease at once, and in a very few cases it continues throughout. During lactation it is usually, but not always, in abeyance. This condition is known as one of amenorrhœa.

The menstrual periods usually recur every 28 days, but in some women the time may be every 3 weeks. They last from 3 to 6 days, but they may be longer or shorter. From four to eight ounces of discharge comes away. It is a darkish red colour, with a peculiar heavy odour, and consists of blood mixed with mucus from the uterine glands. It is generally fluid, but occasionally clots are passed.

Just before the flow begins there is a flux of blood towards the pelvic organs. The ovaries and uterus become hyperæmic, *i.e.*, have more blood in them than usual. Ovulation takes place about this time. The mucous lining of the uterus becomes somewhat thickened and engorged with blood. The glands in it secrete actively and there is a free flow of mucus from them. The membrane begins to break down and the blood escapes. By the end of the period the mucous membrane is practically all shed. It quickly re-forms. You can thus see that after every period the mucous membrane is renewed. In some cases the membrane comes away in shreds, or a complete cast of the uterine cavity may be shed.

During menstruation a woman usually suffers from discomfort in the pelvic region. It may only be a feeling of heaviness, but in many cases there is considerable pain,

especially if clots are passed. Her general health will in many cases be affected. Headache and backache are very common. There may be uneasiness, or even pain, felt in the breasts.

Menstruation seems to be connected with the ripening and discharge of an ovum from the ovary, but this does not explain why it should recur every 28 days. In olden days, and at present among uncivilised people, the 28 days' cycle, corresponding with the time between new moons, led to the belief that the moon had something to do with it. A woman was said "to render her tribute to the moon," and among the North American Indians a menstruating woman is said to have "moon in the ass." We can only explain it by saying it is a law of nature. At one time a menstruating woman was looked upon as a creature to be avoided. All sorts of evil influences were ascribed to her, such as souring wine, blighting flowers in a garden, etc. These assertions are of course nonsensical, but a menstruating nurse may be a source of danger to a puerperal woman, if she is not careful to wear proper napkins and to thoroughly disinfect her hands after touching her own soiled napkins. Menstrual discharge very quickly becomes septic when exposed to the air. A menstruating nurse should always wear aseptic napkins, and burn them when soiled.

CHAPTER V.

CHANGES IN THE UTERUS DURING PREGNANCY.

Development of the Fœtus.

Conception usually takes place shortly after a menstrual period, but this is not always the case, as it may occur without menstruation, as before it has been established, during lactation when it is in abeyance, or after it has ceased, that is after the menopause.

Changes in the Uterine Mucous Membrane due to Pregnancy.

When the ovum becomes impregnated the mucous membrane of the uterus becomes thickened and thrown into folds. When the ovum finds its way into the cavity it is caught in one or other of these folds and becomes implanted there. The site where it becomes implanted is where the placenta or afterbirth develops. It may be in any part of the cavity of the uterus, front, back, or at the fundus. The front wall is supposed to be the most frequent as this wall lies lower than the back one when the uterus is in normal position, lying forward on the bladder or anteverted.

Fig. 7. — Formation decidua. (Dalton.)

The decidua. — The thickened mucous membrane is known as the decidua. There are three deciduæ.

The decidua vera is the name given to the entire lining of the uterus, except the small portion on which the ovum rests, which is known as the decidua serotina. This portion becomes specially thickened, and is where the placenta is afterwards formed. It plays an important part in the formation of the placenta.

FIG. 8.—Decidua reflexa growing up round the ovum. (Dalton.)

FIG. 9.—Showing ovum completely surrounded by decidua reflexa. (Dalton.)

Decidua reflexa.—As soon as the ovum is implanted on the decidua serotina, it, by the action of a layer of cells on its surface, burys itself in the decidua until it is completely covered. The part of the decidua which covers the ovum is known as the decidua reflexa. During this time the ovum itself is rapidly growing, and as it increases in size the decidua reflexa is gradually pushed out until it comes against the vera, when they become united or coalesce. It is not until the end of the third month that the ovum fills the cavity entirely. Until this happens there is a space at the lower part into which it is possible to pass an instrument without causing any disturbance to the ovum, and it is from this part the discharge comes in those cases where menstruation occurs for a time or two after conception.

At full time, when the afterbirth and the membranes come away, traces of the decidua can be found on the outer surface of the membranes.

Development of the ovum.—Inside the ovum, development of the child rapidly goes on. For the first three months the little organism is known as an embryo, and from that time on until birth as a fœtus.

The embryo, and afterwards the fœtus, is enclosed in two membranes. The one is known as the chorion, and the other the amnion.

Chorion.—The chorion or outer sac is formed about the third week. All over its outer surface there are numerous small projections or tufts called villi, which give it a shaggy appearance. These villi become embedded in the surrounding decidua reflexa and serotina. They fix the ovum in position, and also serve to nourish it, as there are minute vessels in each. By the end of the second month, however, those over the decidua reflexa disappear, while those dipping into the serotina increase rapidly in size and form a large part of the placenta or afterbirth.

Amnion.—The amnion or inner layer of the membranes lies inside the chorion, and, as a rule, closely applied to it, but occasionally there is a small amount of fluid between the two. If we trace the amnion back towards the placenta we find it covers the surface of the placenta next the fœtus, and is continuous with the outer covering of the cord.

Liquor Amnii.—This is the fluid which surrounds the fœtus. It is derived from the maternal blood by transudation, and probably to some extent from urine excreted by the fœtus. It protects the fœtus from shocks and pressure, and allows of free movement in the uterine cavity. As we shall see later, the bag of waters is the best dilator of the mouth of the womb. This fluid, when it escapes during labour, washes out the passage and also moistens it. In some cases there is very little liquor amnii and the movements of the fœtus are then apt to cause the mother considerable discomfort. In others, again, there is an excessive amount,

causing a condition known as hydramnios, with which we shall deal later.

Placenta.—The placenta or afterbirth is the medium of attachment between the mother and fœtus. It is formed during the third month. The site of the placenta, as we have already said, is the decidua serotina. This forms what is known as the maternal portion. The great bulk of the placenta, however, consists of immense numbers of chorionic villi. In the decidua serotina are many blood spaces or sinuses, through which the mother's blood circulates. The blood is brought to each sinus by an artery, and carried away again by a vein. The artery brings pure blood, while the vein carries away the impure blood.

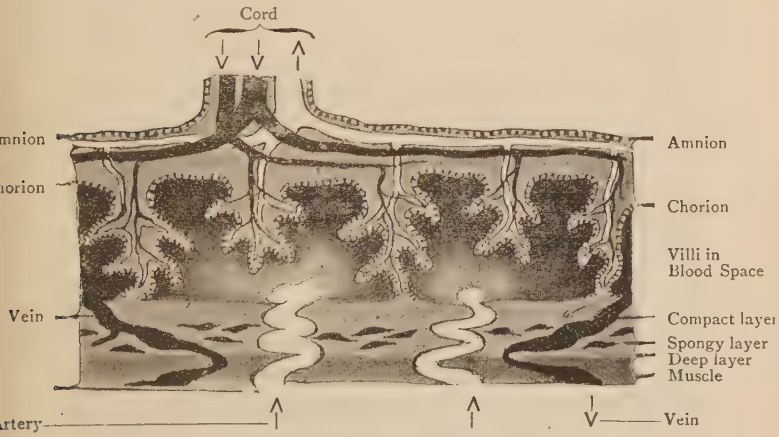

FIG. 10.—Diagram of placenta and its circulation. (Fothergill.)

Into these maternal blood spaces the villi of the chorion project. In each villus, which is really a blind sac with very thin walls, very minute vessels exist, through which the blood of the fœtus flows. You thus see that each villus with fœtal blood circulating through it hangs, as it

were, in a pool of maternal blood. The two bloods never mix, but the thin walls between them allow an interchange of substances to take place, in the same way as occurs in a living person's lungs. The fœtal blood gets oxygen, and gives up its impurities to the mother's blood. Besides oxygen, the fœtus is also supplied with nourishment in the same way from the mother's blood. You can thus see what an important organ the placenta is. It not only acts as a lung to the fœtus, but also as a stomach.

In shape the placenta is generally circular, about the size of a soup plate. It is about 7 inches across and from 1 inch to 1½ inches thick, and weighs about 1½ pounds.

There are two surfaces, named the **maternal**, which lies next the uterine wall, and the **fœtal** which is next the fœtus.

The maternal surface is rough and irregular, with a number of grooves in it running in all directions, and dividing it into small divisions called cotyledons. In the placenta of some animals each cotyledon is separate, but in a woman's they lie close together. The greater part of the placental substance is made up of an immense number of hypertrophied villi of the chorion, which forms the fœtal portion of it, while over these there is a thin layer of the decidua serotina, which forms the maternal portion. You cannot distinguish between the two with the naked eye. The fœtal surface is covered over with the amnion, which has a smooth and shining appearance, and beneath it can be seen numerous blood vessels. These vessels radiate from the vein and arteries which enter and leave the placenta through the umbilical cord.

From the edges of the placenta the membranes (the chorion and amnion) come off. As a rule, the placenta is all in one piece; but occasionally there are small detached lobes. One of these may very easily be left behind in the uterus and cause serious mischief.

The placenta and membranes must always be carefully examined immediately after expulsion to see if everything is complete. You must therefore make yourself thoroughly conversant with the appearance of the placenta and membranes, so as to be able to recognise whether or not everything has come away.

The umbilical cord or funis.—The umbilical cord or funis springs from about the centre of the fœtal surface of the placenta. In some cases it is attached near the edge, forming what is known as a battle dore placenta, and in rare cases the vessels in it spread out on the membranes before entering the placenta. This is known as a velamentous insertion of the cord.

The cord is usually about a couple of feet long, but it may be only 6 inches, while in other cases it may be 5 or 6 feet long. It is usually spirally twisted. The outer coat is continuous with the amnion, and within this lies a jelly-like substance—Wharton's jelly—surrounding the vessels, two umbilical arteries, and one vein. These vessels convey the fœtal blood to and from the placenta.

The cord hangs free in the liquor amnii, but in many cases, especially if it be long, it is round some part of the fœtus. In many cases it is round the neck. Knots are sometimes found on it by the body slipping through a loop. If they are drawn tight, they may cause the death of the fœtus by stopping the circulation. Occasionally in twin pregnancies the two cords get knotted together.

Fœtal circulation.—It would be out of place to go minutely into the fœtal circulation, but you should have a general idea of it. We have already seen that, in a living person, the impure blood passes from the right side of the heart to the lungs, where it is purified before it comes back to the left side to be distributed all over the

body. Before birth, the lungs are of no use for purifying the blood. As we have already seen, the placenta does this. As the lungs are of no use as blood purifiers they are, so to speak, shut out of the circulation by an arrangement in the heart, whereby the greater part of the blood passes directly from the right to the left side, through an oval opening known as the foramen ovale. There is also another arrangement by means of which the blood, which passes in the ordinary way from the right to the left side of the heart, is shunted off from the lungs through a short duct, the ductus arteriosus, which connects the vessel leading to the lungs with the large artery leaving the left side of the heart. In the liver there is also an arrangement for leading the blood straight on to the heart instead of allowing it all to pass through that organ. This is the ductus venosus.

If we follow the blood, commencing at the right side of the heart, we find it passes to the left side in the way indicated, and then on through the fœtus. After the blood has circulated through the fœtus, it is carried to the placenta through the umbilical arteries. These arteries run through the cord, and when they reach the placenta they divide and subdivide, much like the branches of a tree, until they end in minute twigs (capillaries), in each villus. As the blood passes through the villus it is purified, and it returns through another set of minute twigs, which gradually increase in size until they unite to form the umbilical vein which carries the pure blood back through the cord to the fœtus. From the umbilical vein the blood is carried through the liver, by the arrangement spoken of, to the right side of the heart, and after circulating through the fœtus, as we have just seen, it again goes back to the placenta to be purified, and so on, time after time. As soon as birth takes place and the child breathes, the lungs come into play, the opening between the right and left

side of the heart closes and the ductus arteriosus and ductus venosus shrivel up. In rare cases this opening does not close, and we have a "blue baby." If closure does not occur within a few hours the child will probably die, but it sometimes lives for some years. It will always be delicate and never fit for much. Nothing can be done to assist the closure of the foramen. The blueness of the child is of course due to the blood not being properly purified, as only a portion of it is passing through the lungs

CHAPTER VI.

SIGNS AND SYMPTOMS OF PREGNANCY.

The indications of **pregnancy** may be studied under two headings, viz., subjective and objective indications.

The **subjective** indications or symptoms are those which the patient experiences herself, such as the suppression of menstruation, morning sickness, quickening, etc. These indications cannot be observed by the doctor or nurse, but are experienced by the patient herself and described by her. You cannot always depend upon a patient's description of her symptoms, because she may wilfully or unintentionally deceive you. In making a diagnosis the symptoms of pregnancy are therefore not of very great assistance alone.

The **objective** indications or signs can be seen, felt, or heard by the doctor or nurse, such as enlargement of the abdomen, the areolæ round the nipples, ballottement, the movement of the fœtal parts and the fœtal heart. These are, therefore, by far the most valuable indications.

The Subjective Indications or Symptoms.

Suppression of menses.—This is usually the first indication a woman has that she is pregnant. It is known as physiological amenorrhœa. It is a very constant symptom; but, in a fair number of cases, menstruation occurs once or twice after impregnation, and in a few rare cases it continues throughout the whole pregnancy. On the other hand, it must be constantly borne in mind that menstruation may

cease from various other causes, such as bloodlessness, consumption, etc. The change of life may also lead a woman to suppose she is pregnant, but in these cases the cessation is not usually all at once, but gradual. In unmarried women, who have placed themselves in the way of becoming pregnant, occasionally the dread of such an event having happened to them is sufficient to suppress the flow for a short time at all events. As a rule, if a woman is in good health and has been previously regular in her periods, the sudden stoppage indicates pregnancy, if she has recently had intercourse.

Morning sickness or vomiting of pregnancy.—This is a pretty constant indication. It may commence immediately after conception, but usually after the first period has been missed, and last until about midterm, but in some cases it lasts throughout the whole time, while in others it may not come on until the latter months. It is probably due to a disturbance of the nervous system.

It usually occurs on rising in the morning, hence the name; but it may occur at any time during the day. There may only be a feeling of sickness or nausea without actual vomiting, but in most cases vomiting occurs, and the breakfast or other meal is rejected. In some cases all food is rejected, and if this continues for any length of time it becomes a very serious disorder, known as uncontrollable or incessant vomiting, of which we shall treat when speaking of the disorders of pregnancy.

Bladder symptoms.—In the early months most women are troubled with frequency of micturition. This is due to the enlarging uterus pressing on the bladder. As a rule it passes off when the uterus rises up in the abdomen. It is not peculiar to pregnancy, as any tumour in the pelvis will cause it.

Salivation.—This is not a very common indication, but it is sometimes very troublesome. The secretion of saliva

in the mouth is excessive. It may amount to a couple of pints in a day.

Quickening or stirrage.—This is the first indication that a woman has, of life in the fœtus. It is known as "feeling life." It is usually felt about the sixteenth week, but may be earlier or later. In cases where menstruation has been in abeyance at the time of impregnation, it is important to ascertain the date of quickening, as from it an idea can be gained when labour is due. The movements first felt cause a sensation much like fluttering. They become stronger as the fœtus grows. In some cases the movements are very violent, and cause the woman considerable discomfort in the later months of pregnancy, while in others they are hardly felt at all. If the fœtus dies, movements of course cease, but very frequently they cease for it may be days and then become active again, so that the cessation of movements for a day or two cannot be taken as an indication of the death of the fœtus. In a thin woman, in the later months, the movements can easily be seen, provided there is not very much liquor amnii in the womb. They can also in many cases be easily felt.

The movement of the fœtus is an important indication of pregnancy if you can feel or see it, but you cannot always put a great deal of dependence on the statements of the patient herself. She may wilfully mislead you, or, on the other hand, she may be misled herself by movements of gas in the bowels, giving the same sensation when she is not pregnant.

Pain in the breasts, especially in the left breast, is generally complained of, and there are various other symptoms of an indefinite nature which recur pretty constantly, so that a woman who has been pregnant once will probably experience the same series of them in subsequent pregnancies. Some women profess to be able to tell when they have had a fruitful intercourse.

OBJECTIVE INDICATIONS, SIGNS—WHICH YOU OBSERVE FOR YOURSELF EITHER BY SIGHT (INSPECTION), TOUCH (PALPATION), OR HEARING (AUSCULTATION).

Changes in the breasts.—These begin to show about the third month. The breasts increase in size, and veins can be observed through the skin. The nipple becomes much darker in colour, and round about it the areola deepens in colour and increases in area. The colour of the areola differs according to the complexion of the patient, from a pinkish colour in a fair, to dark brown or nearly black in a dark person. Surrounding the nipple will be seen a number of small papillæ or projections about the size of a split pea. By squeezing the breasts a few drops of milk can be expressed. As the breasts enlarge the deeper layer of the skin gives way, and what are called "striæ," or streaks, form. These are seen as pinkish streaks at first when new, and later on they become whitish in colour. As we shall shortly see, the same kind of markings can be seen on the abdomen when it becomes distended.

Of the breast signs of pregnancy the darkening of the areola is the most important, especially in a first pregnancy. All the others may be present without pregnancy, or they may be wanting although pregnancy exists.

Changes in the abdomen.—In some cases, especially in multiparæ, *i.e.* women who have borne one or more children, the abdomen begins to enlarge after the first period is missed, but in the majority there is no enlargement until after the third month. In fact, in many the lower part of the abdomen becomes flattened. The reason of this is that during the first three months the uterus lies in the pelvic cavity, and its increased weight causes it to sink somewhat. By the end of the third month the

fundus is at the brim, and from that time onwards it steadily rises in the abdomen and causes distension. Some women show very little distension, even at full time, while others become enormously stout. This depends upon the build of the patient, the laxity of the abdominal muscles, and of course the size of the child and amount of liquor amnii in the uterus. With twins or triplets the abdomen will be much larger than with a single child.

As the abdomen enlarges and the skin stretches, streaks or striæ (striæ gravidarum) begin to show, the same as on the breasts, but more marked. The new ones are pinkish in colour, while the older ones are white. In some cases they are very numerous towards the end of pregnancy, and they can often be seen on the upper part of the thighs. They are not peculiar to pregnancy, as a tumour or dropsy, which distends the abdomen, will cause them. In rare cases you find very few of them. They remain afterwards as white streaks and show distinctly that the abdomen has been distended at some time, but not necessarily by pregnancy.

Besides these streaks, you will observe a general darkening of the skin of the abdomen, especially in dark women, and a distinct dark line, the linea nigra, extending down the centre of the abdomen from the lower end of the breast-bone to the top of the symphysis pubis. In many cases it is only very distinct between the umbilicus and the pubes.

Enlargement of the abdomen. — Inspection of the abdomen during the first three months will not usually reveal much except a slight flattening and a drawing in of the umbilicus. From the third month onwards enlargement becomes apparent. This is specially marked after the third month, and reaches its maximum at the end of the ninth month. The contour is regular in outline. The umbilicus, which is at first depressed, gradually comes to

the surface, and during the last two months it usually, though not invariably, projects somewhat. If the abdominal muscles are relaxed, as in women who have borne many children, the enlarged uterus will tend to fall forward and form what is known as a pendulous abdomen. In some cases, where the abdominal walls are thin, the movements of the fœtus can be distinctly seen.

Palpation of the abdomen.—After the uterus has risen out of the pelvis, *i.e.* after the fourth month, it can be felt by touch. The patient should be lying on her back with her knees drawn up. The warm hand or hands should be placed flat upon the abdomen, and firm pressure be made with the fingers. The patient's attention should be distracted from what is being done by engaging her in conversation, so that she will relax her abdominal muscles as much as possible. If the muscles are kept tense, you may not be able to feel the uterus at all. The uterine tumour will be felt somewhat round and smooth. The size of it will vary with the time of pregnancy.

From the sixth month onwards the fœtal parts and movements may be felt. If the hand is kept on the abdomen for a little time, a distinct hardening of the uterus will be felt, followed by a softening. This intermittent contraction is practically never felt in any other tumour, so that it is a very valuable indication of pregnancy. The feeling of the fœtal parts and movements is a positive indication of pregnancy.

Height of the fundus at different periods.—There are three points or landmarks at which the fundus should be felt at three periods of pregnancy. At the end of the third month the fundus is just rising above the brim, that is, it lies level with the symphysis pubis; at the sixth month it reaches the level of the umbilicus; while at the end of the ninth month it may be felt at the lower end of the breast-bone. During the last fortnight or so it falls some-

what. As the rate of growth is regular, the time of pregnancy can be fairly well judged by the position of the fundus.

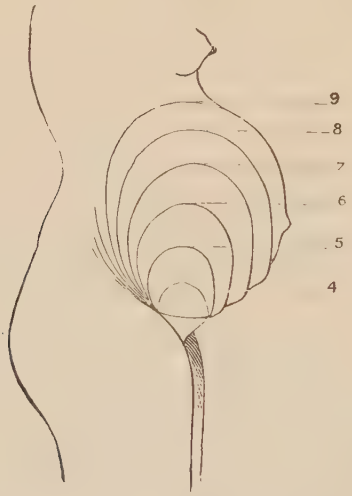

FIG 11.—Size of uterus at various periods of pregnancy. (Playfair.)

Ballottement.—This is a valuable sign. It is best got by having the patient placed in a half sitting posture. The forefinger or fore and middle fingers are passed into the vagina, and the tip or tips placed immediately in front of the cervix uteri. A sudden push upwards with the fingers will cause the fœtus to bob up, as it were, in the liquor amnii, and in a few seconds it will fall again gently on the top of the fingers with a gentle tap. It is best felt between the fourth and seventh months when there is plenty of room for the fœtus to move about in the liquor amnii. It is a very valuable sign of pregnancy, as there is practically no other condition which will give it.

Changes which may be observed in the vagina and cervix.—From about the third month onwards the mucous membrane will be noticed to have become bluish in colour.

This is due to the pressure of the enlarging uterus or the surrounding veins causing a certain amount of congestion of the parts. Very frequently the veins of the labia will be found to be in a varicose condition. The mucous discharge from the vagina will usually be free. None of these conditions are peculiar to pregnancy, as the pressure of any form of tumour will cause them.

Changes in the cervix uteri.—To the examining finger the cervix of a non-pregnant uterus feels fairly firm, much like the feel of the tip of the nose, while in the pregnant uterus it feels softer, more like the feel of one's lips. This is due to the increased blood supply. At one time it was supposed that the cervix became shortened during pregnancy, but it is now known that it retains its full length until about the last week. The cavity is filled with a plug of mucus. In many cases, towards the end of pregnancy, the os externum will admit a finger or even two.

Sounds which may be heard in the uterus.—By placing the ear to the abdominal wall, or, more usually, by listening through a stethescope placed against the abdomen over the uterus, certain sounds can be heard. The first sound which strikes one is a rushing or blowing sound, which is known as the **uterine souffle or bruit.** It can be heard distinctly from the fourth month onwards. It is caused by the blood rushing through the arteries in the uterus. It is heard also in tumours of the uterus (fibroids), so it is not distinctive of pregnancy.

Fœtal heart.—If the fœtus is alive its heart can be heard beating from the fourth month onwards. It is a faint double sound not unlike the ticking of a watch heard through a pillow or clothing. You must be sure there is no watch in the bed, or you may be misled. It beats at the rate of about 130. In listening to it, have your finger on the patient's wrist to feel her pulse at the same time. If her pulse should be very quick, you might

mistake it for the fœtal heart, as you will hear it in the abdominal artery. The fœtal pulse should be much quicker than the mother's. The position in which it is heard loudest varies according to how the child lies in the uterus. Near full term it is most usually heard about two inches below and to the left side of the umbilicus. When the child lies with the head downwards, as it most usually does, the heart is heard best below and to one or other side of the umbilicus, according to which side the back of the child lies. If the breech of the child is lying lowest, it will be heard best above the umbilicus to one or other side. When the child lies across the mother it will be heard best below the umbilicus, nearer the pubis than with the head lowest. As a rule, if the child is alive, the heart can be heard, but this is not invariably the case.

There is another sound occasionally heard, known as the **"funic souffle."** It is a whizzing sound at the same rate as the fœtal heart. It is caused by the fœtal blood rushing through the vessels of the cord which has become wound round the child.

Of the many indications of pregnancy none of them are absolute except the fœtal heart, the fœtal parts and movements. If you can make these out definitely, you can be absolutely sure of your diagnosis.

Diagnosis of Pregnancy.

During the early months it is very difficult. The following conditions will point to it. Amenorrhœa, morning sickness, frequent micturition, discomfort in the breasts, increase in their size, the presence of a clear fluid in them, darkening of the areola in primiparæ. The woman may be able to indicate other feelings, such as cravings for unusual forms of food, etc., which she has experienced in former pregnancies.

On making an examination, in some cases there may be some distension of the abdomen, but in many it will be flattened. The vagina will be dusky in colour, the cervix

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will feel soft, and the uterus will be felt to be enlarged. Distinct pulsation can usually be felt in the anterior fornix. If you pass a thumb into the anterior vaginal fornix and a finger into the rectum, and press the uterus downwards with the other hand on the abdomen until you can grasp the lower uterine segment, you will find it is quite soft and that there seems to be very little tissue between the finger and thumb. This is known as Hegar's sign of pregnancy.

In many cases you cannot be sure of pregnancy in the early months. By waiting a month or two until more certain indications appear, a definite diagnosis may be made.

About the sixth month some of these indications, such as sickness, may have disappeared, while others will have become plainer. In addition, the abdomen will have enlarged, striæ will be beginning to form, and the linea nigra commencing to show. The fundus of the uterus will be felt about the umbilicus. The patient will also be able to tell you if she feels movements.

On examination of the abdomen by palpation, the enlarged uterus will be felt, and in many cases, the fœtal parts. Intermittent contractions can be felt. Auscultation should reveal the sounds of the fœtal heart if the child is alive, and also the uterine souffle. By a vaginal examination you will notice the dusky colour, the softening of the cervix, the enlargement of the uterus, and perhaps you may feel the head if it is presenting. Ballottement will be easily got.

At the sixth month a definite diagnosis can usually be made, but it is not always easy to decide between a pregnancy and a tumour reaching to the umbilicus. With a tumour you will get no intermittent contractions, no fœtal heart, and no fœtal parts. If it is a fleshy or fibroid tumour of the uterus, you will get a uterine souffle, but not in an ovarian tumour. With fibroid tumours menstruation will not, as a rule, have ceased.

Near full time the diagnosis should be easier. The

fundus should be near the lower end of the breast-bone, the fœtal parts should be easily felt, and the fœtal heart easily heard if the child is alive. The presenting part can generally be easily felt through the vagina.

It must always be borne in mind that pregnancy may be present along with a tumour, but such cases are comparatively rare.

False or Spurious Pregnancy.

This is known as pseudo-cyesis. It occurs in hysterical women who are very desirous of bearing children, and especially in women near the menopause. Menstruation, as a rule, will be entirely absent, or very scanty and irregular. The abdomen and breasts enlarge, and the patient will usually complain of all the ordinary symptoms, such as morning sickness, etc., and will profess to have quickened, and to feel the movements regularly. In her own mind she will be firmly convinced that she is pregnant. She may make all preparations for her confinement, and have her nurse in attendance. In some cases a spurious labour will come on, and the patient will profess to feel the ordinary pains of labour, but nothing will result.

The only way to decide the matter is by making a careful examination. On percussing or tapping over the abdomen no dull sound will be got, but what is called a tympanitic sound like what you would get on tapping over a bag distended with air. No fœtal heart or uterine souffle will be heard, and by engaging the attention of the patient by conversing with her, you will be able to press your hand down into the swelling so as to satisfy yourself that there is no tumour present. The swelling is caused by gas in the bowels. If the patient be put under chloroform, the abdominal wall will fall flat, and you can pass your

hand deeply down, so as to feel the back wall. A vaginal examination will reveal that the cervix is not softened, and that the uterus is not enlarged.

Many of these cases are not discovered until the patient supposes she is in labour, and others again only after her supposed full time has been passed, because no examination has been made by the medical attendant. He naturally takes the woman's statement that she is pregnant, and will not examine her before she is in labour, unless there is some reason for doing so. When the nurse is in the house waiting, if her suspicions are aroused, she should communicate with the doctor without letting the patient know, so that he may definitely settle the matter as soon as possible. It will be a great disappointment to the patient and her friends, no doubt, but that cannot be helped.

The Duration of Pregnancy.

In the human female, pregnancy lasts about 280 days, counting from the first day of her last menstrual period. To find out the date when the confinement may be expected, add seven days to the date of the first day of her last menstruation, and count back three months. This may not give you the exact date, but it should be within two or three days of it. This is counting on impregnation taking place a few days after she ceased menstruation, as is generally the case, but if the impregnation has occurred a day or two before her next period was due, you may be a fortnight wrong.

If she has not been menstruating when she became pregnant, or if she should menstruate once or twice after it occurs you will have to make your calculation from the time of quickening by adding on four and a-half months, and also have to judge by the size of the uterus. Both of these are very uncertain helps.

CHAPTER VII.

DISORDERS OF PREGNANCY.

It is a rare thing for a woman to pass through her pregnancy without suffering some discomfort peculiar to pregnancy. A pregnant woman is of course liable to take any of the ordinary diseases, such as fevers, etc. Some of these diseases do not interfere with the pregnancy, while others, again, may bring it to an end by causing an abortion in the early months, or a premature labour in the later. The risk to the woman will be increased by this. Some of the diseases, such as smallpox, may be communicated to the fœtus in utero, and it may be born with the eruption upon it. There is one disease, viz., syphilis, which, if present in the mother, will affect the fœtus, and very often cause an abortion or its expulsion prematurely dead, but in many cases alive and apparently quite healthy. In such a case, within a week or two, the disease will show itself in the form of a copper-coloured rash about the buttocks, or, it may be, all over the body. Cracks usually form about the mouth, and the breathing through the nose will be obstructed, causing "snuffles."

The consideration of these diseases and their effect upon pregnancy is beyond the province of a nurse, so we shall confine ourselves to the disorders peculiar to pregnancy.

Excessive sickness.—Most women suffer from a certain amount of sickness, and in the majority of cases no particular treatment is required, except to regulate the diet and keep the bowels open.

If the sickness persists beyond the fourth month, and is very severe, it becomes a dangerous complication, as the patient's strength will be worn out, and if she goes to full time she will not be in a condition to stand the exhaustion of labour. It may occur in any pregnancy, but is most frequently associated with over-distension of the uterus from twins, or excessive liquor amnii.

The **treatment** consists in having the bowels kept free and giving bland and easily digested food, such as milk foods, which in many cases should be peptonized. Milk and lime water, or potash water, should be given. In many cases rectal feeding, by giving injections or suppositories by the bowel, will be necessary, but this cannot be carried on for any length of time. The medicinal treatment must be left to the doctor. Drugs which act as sedatives in the stomach, such as bismuth, oxalate of cerium, bromide of potash, dilute hydrocyanic acid, and many others, are used. If these fail, the pregnancy must be brought to an end by the induction of an abortion or premature labour, which is entirely without the province of a nurse. The induction of an abortion or premature labour is usually only done as a last resort, and, unfortunately, when the patient is greatly exhausted, so that the chances are very much against her recovery.

Dyspepsia and Constipation.— Many women suffer severely from acid dyspepsia. In such cases there will be a burning sensation in the stomach, and eructations of gas and hot sour fluid. The treatment consists in giving alkalies, such as magnesia, bismuth or soda, and keeping the bowels free. The food should be very light.

Constipation is a very common complaint. Most women are prone to this at other times, and pregnancy renders it worse by the pressure of the enlarging uterus upon the bowel. Piles, which are very often present before pregnancy, are very apt to become much more trouble-

some from the constipation, and also from the pressure of the uterus interfering with the return of the blood.

In all cases an attempt should be made to secure a daily movement of the bowels. Attention to the diet may suffice by taking porridge in the morning, using brown bread and stewed fruits, etc. If this does not suffice, laxative medicines must be used, such as a dose of a mild saline the first thing on rising. Cascara sagrada is also a valuable drug. A small dose of castor oil is excellent, but it is rather unpleasant. In bad cases, enemata may have to be resorted to, but they must be used with care. Glycerine enemata or suppositories are sometimes very useful.

Salivation, or the excessive secretion of saliva, is occasionally a distressing complaint. Treatment does not seem to do much good for it, but some relief may be obtained by the use of alum or other astringent gargles. It will cease on delivery.

Leucorrhœa or whites.—A discharge of whites from the vagina is very common, and in some cases it becomes excessive, and causes very great discomfort by irritating the external parts and setting up what is known as pruritis. This is characterised by an intense itching. The patient is usually unable to refrain from scratching the parts, which only makes matters worse. In bad cases, the itching becomes almost unbearable.

Treatment.—In all cases the external parts must be kept absolutely clean by bathing them. The leucorrhœa may be checked by the use of tepid astringent injections of alum or borax, but care must be taken to give these injections gently, and not too warm, for fear of causing an abortion or permature labour. To the external parts sedative lotions and ointments should be applied, and the patient may require hypnotics to obtain sleep.

Jaundice.—In most cases this is slight and of no con-

sequence, but in rare cases it becomes very marked, and is the sign of a very fatal disease, known as acute yellow atrophy of the liver. It usually proves fatal in a few days.

Irritability of the bladder.—This is very common in the early months, causing the patient to make water very frequently. As we have already seen, it is due to the uterus pressing on the bladder. In some cases it may be due to the uterus being turned back and thus dragging on the bladder.

Retention of urine.—If the uterus is turned back or retroverted during the third and fourth month it presses on the neck of the bladder, and will cause retention of urine. The bladder becomes distended, and it can be felt in the abdomen as high or even higher than the umbilicus. It has frequently been mistaken for the uterus or a tumour. There is one very misleading feature which must specially be borne in mind, and that is that the patient will complain of urine constantly dribbling away from her. She will likely tell you that she is passing plenty of urine, as it is continually running away from her. What is really happening is that there is an overflow from the over-distended bladder, and it is well this is taking place, otherwise the bladder would be sure to rupture. If a woman complains of urine constantly dribbling from her during the third or fourth month of pregnancy, it is almost sure to be due to a backward displacement of the uterus. We shall deal with this condition later on.

Retention of urine is sometimes found towards the end of pregnancy, and also during labour, from the presenting part pressing on the neck of the bladder. In such a case the catheter must be passed. The method of doing this will be fully explained later on.

Albuminuria.—If normal urine is boiled in a test-tube after a drop or two of acetic acid has been added to it, no

white cloud should form in it. If a white cloud or precipitate forms in it, albumen is present. If it is present to any degree in the urine of a pregnant woman, it shows that her kidneys are out of order, and there is grave risk of her taking fits or convulsions during the later months of pregnancy, or when labour comes on.

When there is albumen in the urine you usually find swelling of the feet, legs, arms, body, and face, the latter especially in the morning. We shall afterwards consider this condition and its treatment.

Œdema, or swelling of the feet and legs, is a very common condition, apart from that found with albumen in the urine. It is due to the pressure of the enlarged uterus interfering with the return of the blood to the body through the large veins from the legs. The veins of the feet and legs will be found to be distended and knotted or varicose, and they may become inflamed. If one of them should burst, the patient would very quickly bleed to death.

The treatment consists in resting in the horizontal position with the legs raised, and the wearing of elastic bandages, which should always be put on before the patient rises. The bandage should extend from the toes up as high as the enlarged veins are. Elastic stockings are not so useful as bandages. If a vein should burst, the patient must be laid down at once and a pad firmly bound over the spot.

Disorders of the Nervous System.

The **nervous system** is in a high state of tension. This shows itself in irritability, sleeplessness, headaches, neuralgia of various parts, toothache, etc. In rare cases there is loss of power of the legs (paraplegia), or of an arm and leg of one side (hemiplegia). Severe cramps, especially in the muscles of the legs, are not unfrequent.

Chorea or St. Vitus dance.—This is a serious disorder. It shows itself by irregular twitchings of different parts of the body. In bad cases the movements may become so

violent that the patient can hardly be kept in bed. It usually occurs with the first pregnancy in women who have had it in childhood. The treatment of it should never be undertaken by a nurse. If drugs fail to relieve the condition, labour will have to be induced, and if the patient is not too exhausted, recovery will probably take place after the uterus is emptied, but some die and others become insane.

Insanity.—Insanity may occur in pregnancy, especially in cases where there is a strong predisposition. Prolonged mental strain, as from the shame of an illegitimate pregnancy or from desertion, may bring it on. It may also arise in cases of chorea. A severe mental strain or sudden shock will be found to be the exciting cause in most cases.

It may take the form of mania or melancholia, the latter being the commoner. The patient may sink into a condition of profound lethargy. Moral perversions are common, such as dipsomania (drinking) and kleptomania (thieving). Suicidal tendencies are generally strongly developed.

Primiparæ are more prone to attacks than multiparæ. Attacks are liable to recur in subsequent pregnancies. The seizure may begin with conception, but the end of the third month is the most usual time. It rarely disappears until after delivery.

Prognosis.—This is fairly favourable, as recovery usually occurs within a few months of delivery, but there is considerable risk of a recurrence in subsequent pregnancies.

Treatment.—The patient must be carefully watched and be made to take plenty of nourishing food. She should be kept as cheerful as possible. For sleeplessness, hypnotics will have to be given. Induction of labour may be necessary.

Disorders of the Heart.

Heart disease is not a disease peculiar to pregnancy.

Pregnancy, however, affects the heart by giving it much extra work to do. The heart becomes somewhat enlarged, the left ventricle especially, so as to enable it to do the extra work. If any disease has existed before pregnancy, the greater strain thrown on the heart will affect it badly. In bad cases the patient will become very breathless on the least exertion. Her face will have a bluish appearance, and she will become dropsical. The lungs will become affected, and coughing and perhaps spitting of blood come on.

The condition is a very serious one, and in many cases the strain of labour causes the death of the patient. A nurse must never undertake to attend the labour of such a patient alone. The treatment is for a doctor to undertake.

Faintings or Swoonings.—With delicate young women these are not very uncommon, especially about the time of quickening. The patient must lie down at once and have her clothing loosened. A dose of sal volatile, a teaspoonful to a small tumblerful of water, is the best remedy. Spirits of any kind will answer the same purpose, but they should be avoided for fear of a liking for them being acquired.

Disorders of the Lungs.

Some patients are troubled with a cough during pregnancy. If the lungs are not diseased, it is of no consequence except for the discomfort.

Pregnancy occurs not unfrequently in consumptive women. In an advanced case the patient's breathing will be very much embarrassed by the pressure of the enlarged uterus. As a rule the disease in the lungs does not advance much during the pregnancy, but as soon as labour is over the advance is generally rapid, and a fatal termination may be looked for within a few weeks The child is usually small and weak.

CHAPTER VIII.

DISPLACEMENT OF THE UTERUS AND ABNORMAL PREGNANCIES.

As the **uterus** is an organ freely movable in certain directions, it is liable to displacements when non-pregnant, and also when pregnant. It may have been in an abnormal position at the time of impregnation, or the displacement may have occurred subsequently.

The normal position is a somewhat forward curved one, so that it lies on the bladder. As we have already seen, as the pregnant uterus increases in size during the first three or four months, it presses upon the bladder and causes frequency of micturition. The weight of the uterus also causes it to sink slightly in the pelvic cavity during the first three months. Strictly speaking, these are not displacements at all, but if the supports of the uterus are lax, they may become so. In the later months especially, the anterior displacement of the uterus may become so great, when the abdominal muscles are weak, that in some cases the uterus lies bent forwards to such a degree as to lie almost against the thighs. Such a condition is known as a pendulous abdomen. It causes great discomfort to the patient, and will be a serious complication in labour, as the child will not be driven into the brim of the pelvis but against the back of it. It is commonest among multiparæ and women with contracted pelves.

Treatment.—The patient should wear a stout firm binder to support the abdomen, and in labour she should lie on her back with a tight binder on.

Downward displacement, prolapse or falling of the womb.—This usually occurs in women who have had it before impregnation, especially in those who have had the perineum torn in former labours. The increase in weight will cause the uterus to sink, especially in the early months, but in the later months, when it has risen into the abdomen, the prolapse will lessen. There are some cases, however, where this condition continues to the end.

Treatment.—The womb must be supported by a suitable instrument. A rubber ring pessary is usually the best. It should be worn for the first four or five months only.

In some cases the cervix is very much enlarged or hypertrophied, so that the external os lies at the vulva. This is really not a displacement.

Posterior displacement or retroversion of the gravid uterus.—In this condition the uterus is bent backwards, and the body of it lies in the back part of the pelvic cavity against the rectum. It may have been in this position before impregnation, or may have assumed it subsequently, from such a cause as a sudden jolt or strain, especially with a full bladder. A full bladder lifts the uterus up and pushes the fundus back, so that any severe strain at such a time may tilt it further back until the fundus falls on to the rectum. At first it may not cause much disturbance, except pain in the back, but as it increases in size the bladder will be dragged upon, and finally the cervix will be pushed forwards so as to compress the urethra and neck of the bladder, and cause retention of urine. The bladder will become over-distended, but fortunately some urine trickles away continuously or the bladder would burst. Such an accident has happened. The rectum will be pressed upon and constipation, or, more rarely, diarrhœa, caused.

In some cases the uterus frees itself from under the promontory as it grows, and the patient gets relief; but

this is not to be depended upon. As it increases in size the pressure becomes greater and greater, and may cause sloughing of the perineum, and the walls of the uterus may become gangrenous. In rare cases the bladder bursts. In some the ovum is expelled, *i.e.*, an abortion comes on, and the uterus then decreases in size.

Diagnosis.—If a woman who is two or three months pregnant complains of urine dribbling away continuously, always suspect this condition. On palpating the abdomen, a large rounded swelling will usually be found, much larger than the uterus should be, in fact, the uterus cannot be felt in the abdomen until after the fourth month. This swelling is caused by the distended bladder. A vaginal examination will reveal that the cervix is pushed high up and well forwards, and that there is a rounded swelling in the back part of the pelvis pressing upon the rectum.

Treatment.—The first thing to do is to relieve the bladder by passing a catheter. If there is a very large amount of urine, it is better not to take it all away at once, because the sudden relief of tension on the wall of the bladder may give rise to bleeding from the vessels in the mucous membrane. The patient should be kept quiet in bed, and be given an opiate after the bowels are cleared out. Next day the bladder should be thoroughly emptied, and an attempt should be made to replace the uterus. This is an operation which should not be attempted by a nurse, unless she is in a place where no medical assistance can be obtained.

In some cases replacement can be done by passing the fore-finger of the right hand into the vagina, and the middle finger into the rectum, and pressing very firmly upwards; with the middle finger the fundus may be pressed up until it falls forward. Another method is to place the patient on her knees and elbows, and

then to press very firmly upwards on the fundus, with the finger in the rectum. Catching the cervix and drawing it down at the same time assists matters. In most cases chloroform will have to be administered, but it is possible to do without it. If replacement cannot be effected, it will be necessary to bring on an abortion. After replacement a pessary should be worn for a month or two, until the uterus has risen into the abdomen.

This is a condition which is very frequently mistaken for a tumour, but if the simple rule of always passing a catheter before examining for a tumour were adhered to, the mistake would never be made.

In a few rare cases the pregnant uterus has been found in the sac of a rupture or hernia.

Abnormal Pregnancies.

False pregnancy or pseudo-cyesis, which is really not a pregnancy at all, we have already dealt with.

Molar pregnancy.—There are two varieties of **moles.** The fleshy, or carneous mole, when expelled, looks to the naked eye like a mass of flesh. It results from an effusion of blood into the uterine cavity during the early months. Instead of an abortion taking place, as usually happens, the blood clots, and the ovum and deciduæ get formed into an organised mass. This may be retained for a considerable time, but will ultimately be cast off as an abortion is. The little fœtus generally becomes absorbed, so that there may be no trace of it, but, on opening up the mass, a cavity lined with a smooth glistening membrane will be found. This is the remains of the amniotic cavity.

While the mole is retained, some of the signs and symptoms of pregnancy will be present, but the uterus will not increase in size as it should.

The vesicular or hydatiform mole, when expelled, shows a large number of vesicles, not unlike white currants or a bunch of small white grapes. These vesicles are formed from the villi of the chorion, which, instead of disappearing during the second month except where the placenta forms, become changed into vesicles. They multiply rapidly, and quickly distend the uterus much beyond what it should be at the corresponding time of pregnancy. At the end of the third month the fundus may be at the umbilicus instead of the brim of the pelvis. Usually no trace of the fœtus is found, as it has been absorbed.

Symptoms.—You have the usual symptoms of pregnancy, and generally excessive vomiting, and occasionally a reddish watery discharge, in which some of the vesicles may be found. The uterus will be growing very rapidly.

Occasionally the mass is expelled spontaneously, but this is not to be expected. As the vesicles grow, they may, by pressure, thin out the uterine wall, and even perforate it. The condition is thus a dangerous one, and the treatment should never be undertaken by a nurse.

Treatment.—The medical attendant will have to empty the uterus. This is attended with considerable risk. The uterus may be easily ruptured, postpartum hæmorrhage may be very great, and if any of the mass is left behind, septicæmia is very liable to occur.

These moles are always the product of conception, so that when a woman has expelled one of them, there can be no doubt about her having been pregnant.

Extra-Uterine Pregnancy.

In this form of pregnancy, the ovum is not in the uterine cavity at all. The ovum begins to develop in the Fallopian tube, and in rare cases in the ovary itself, when it is known

as an ovarian pregnancy. The tube, as you know, lies at the upper part of the broad ligament, which is, as it were, folded over it. It is thus closely covered by the layers of the ligament at each side and over the top, but the lower part of it is not closely covered: just as a clothes line with a sheet over it is not closely covered at its lower part. The tube is very small in calibre, and as the ovum grows quickly, great strain is thrown on the thin walls, with the result that rupture occurs. If the burst is in the upper part or side of the tube, the ovum will be expelled into the abdominal cavity, and the bleeding will be very severe, and perhaps cause the death of the patient within a few hours. On the other hand, if it is at the lower part, the ovum will be expelled between the layers of the broad ligament, and the bleeding may not be very profuse, as the pressure of the ligament may stop it. If the ovum is not destroyed, it will go on growing between the layers of the broad ligament, which will become separated by the pressure. A second rupture may occur through the broad ligament, and cause the patient's death, or in some cases development may go on to full time, and if an operation is not done, the fœtus will perish and become changed into a litho-pædion or stone child, by the deposit of lime salts, or it may become putrid and discharge through the bowel, vagina, bladder, or abdominal wall, in bits.

It would serve no good purpose to discuss the different forms of extra-uterine pregnancy. It is sufficient for you to know that extra-uterine pregnancies do occur, that they nearly all begin first in the tube (hence the name tubal pregnancy), that they rupture usually between the 8th and 12th week, and that some of them go on developing to full time. In some cases, instead of rupture occurring, the ovum escapes through the abdominal end of the tube into the abdominal cavity. This is known as a **tubal abortion.**

The condition is a very dangerous one for a woman. She may die of hæmorrhage, although there has been no external discharge of blood. In some cases, where the bleeding is not too extensive, a large clot forms in the pelvis, or between the layers of the broad ligament, forming what is known as a pelvic hæmatocele. This may absorb in time, or it may form pus and be discharged as an abscess. We have already seen what happens if development goes on to full time. In some of these cases, where the fœtus has shrivelled up, it has been carried in the abdomen for very many years—in one case for 52 years.

Signs and symptoms of extra-uterine pregnancy.—Usually the ordinary signs and symptoms of early pregnancy are present. In some cases, however, the woman may have no idea she is pregnant. Irregular pains and hæmorrhages from the uterus are common, and shreds of membrane, or a whole cast of the uterus, may be expelled. This is the decidual membrane which forms in the uterus, just as if it were an ordinary pregnancy. When this is expelled it may be taken for an abortion. A nurse must be careful to preserve everything that comes away so that the doctor may examine it. No traces of a fœtus and no chorionic villi will be found in it.

When rupture occurs, the woman will feel sudden pain in the abdomen, and she will at once become collapsed and very pale. Her pulse will become quick and feeble, and if the internal bleeding is great, she may die very quickly. There will probably be some discharge from the uterus at the same time, which may lead you to suppose it is an ordinary abortion, but the collapse of the patient will show that she has lost far more blood than what is visible.

Diagnosis.—It is not a condition which a nurse will ever be called upon to diagnose, but it is well for her to be able to recognise the condition as a serious one, and send

for assistance at once. Before rupture, the uterus will be felt to be enlarged, as if it were pregnant, and there will also be felt a swelling to one or other side of it. After rupture, the collapse of the patient should draw attention to the condition. A vaginal examination may only reveal that the uterus is enlarged and nothing more, but if the blood is clotted, or lying between the layers of the broad ligament, a large mass will be felt pushing the uterus to one or other side.

Treatment.—The treatment is not for a nurse to undertake. She must send for professional assistance at once, and, in the meantime, keep the patient lying absolutely still, with her head low. She must not be allowed to move, as any exertion will only tend to increase the internal bleeding.

Pregnancy in a Double Uterus, Super-Fœtation, and Super-Fecundation.

The uterus in the early stage of development is a double organ. This condition sometimes persists, and we get what is known as a double or bicornuate uterus. Each half has its own ovary and Fallopian tube, so that it is complete. One half may become impregnated and the other half continue menstruating, or the second half may become impregnated several months later than the first. When the labour comes on at full time with the first, it may also come on in the other half, and a full time and a premature child may be born. In other cases again, the second one goes on until full time, and the second child is born two or three months after the first. This is a rare occurrence. It explains a condition which is known as **super-fœtation.** This condition is described as one in which a woman who is already pregnant, say for three months, becomes pregnant a second time, and at full time gives birth to a mature and a premature child, or

to two mature children within three months of each other. In some of these cases a double uterus has been found, and it is likely that this is the case in all. We do not believe such a condition could arise in a normal uterus.

Occasionally, when there is a double uterus, one side has only a very small opening at the cervix, and, if pregnancy takes place in it, the channel may be too small to allow of the birth of the child. The child will then die and be retained in utero, unless an operation is done to remove it. When speaking of **missed labour** we shall refer to this again.

Super-Fecundation.—This is a condition in which a woman becomes impregnated by two different males within a very short time of each other. There is no doubt that such a condition can arise, as it has been definitely proved by a woman giving birth to a pure white and a half-caste child (in the case of a white woman who has been impregnated by a white and a black man); or a pure black and a half-caste (where a black woman has been impregnated by a black and a white man).

Multiple pregnancies.—These are sometimes termed abnormal pregnancies. There may be two (twins), three (triplets), four (quadruplets), and even five children (quintuplets). The sex of all may be the same, or male and female in varying proportions. Each child may have a complete sac and placenta of its own, or two may be in one sac with a single placenta.

We shall discuss these more fully when dealing with labour.

Monsters.—These are the result of abnormal development. Some part of the child, as the limbs, may be wanting, or there may be two children joined together, as the famous Siamese twins were; extra limbs are sometimes seen, two heads, and so on. In other cases again, part of the skull of the child may be wanting, giving rise to an

anencephalic child. In others there may be a want of closure in the backbone, allowing the membranes of the cord to protrude. This is known as a spina-bifida. Tumours of the kidneys, etc., are sometimes seen. There are many abnormalities, but we cannot discuss them all.

The labour may be rendered very difficult and dangerous.

Why these monsters occur we do not know. Maternal impressions are often given as a reason, but this is hardly a cause which can be accepted by science.

Missed Labour.

This term is applied to cases in which, at full time, labour has either not come on at all, or, having commenced, the pains have passed off without causing the expulsion of the uterine contents. The fœtus, which is dead, may be retained for some time.

In some of the cases the membranes rupture at the time of the false labour, and air gains entrance to the uterus, and sets up putrefaction in the fœtus. A foul-smelling discharge will begin to come away, and the fœtus may be discharged in bits. The woman will suffer from blood poisoning, and may die of it.

In other cases where putrefaction is not set up, ulceration of the uterine walls may occur.

It is not known how long a dead fœtus may be retained in utero. Many of the recorded cases have really not been true cases of retention in the uterine cavity, but extra-uterine pregnancies, or pregnancies in a rudimentary horn of a bi-cornuate uterus.

Treatment.—A nurse could not undertake the treatment of such a case. The uterus would have to be very carefully emptied, as the risk of rupturing it would be very great.

CHAPTER IX.

ANTISEPTICS AND ASEPSIS.

A knowledge of **antiseptics** and their uses is of the utmost importance to a nurse. We look upon this as by far the most important subject in connection with midwifery, and therefore insist that a nurse must thoroughly grasp it.

If we look back over the records of midwifery work before the days of antiseptics, we are at once struck with the number of cases of sepsis or puerperal fever which occurred in private practice, and especially in maternity hospitals. Epidemics were constantly occurring in hospitals, carrying off large numbers of patients. The hospitals had often to be closed, and in many cases they were pulled down and rebuilt only to have the same disastrous outbreak sooner or later. Puerperal fever, as it was, and is still, called, was supposed to be an infectious fever like scarlet fever or smallpox. A little over 50 years ago, a Hungarian by the name of Semmelweis made the important discovery that puerperal fever was nothing more nor less than blood poisoning in a puerperal woman, and that the poison gained entrance through the genital tract. It was some time before his views were accepted, but they have stood the test of time. In those days nothing was known of the different minute organisms—microbes, which play such an important part in all morbid conditions of the body. Bacteriologists have been able to cultivate different forms of minute organisms from the discharges of septic or poisoned wounds, and to show by experiment that they are the cause of the condition. These microbes are unfortunately present nearly everywhere, and especially

where there is any dirt, and if they once gain access to any part of the body through a wound, they quickly multiply, poison the system, and set up fever. The tissues of the body, when in a healthy condition, are able to overcome the action of these microbes to a certain extent. Under these circumstances, for instance, if you get a cut, say on the finger, and some dirt gets into it, beyond a certain amount of inflammation which quickly subsides, nothing happens. On the other hand, if your system is run down, and your tissues are not in a condition to resist, serious inflammation may be set up and the whole system be poisoned. If the resistant powers of the body are below par, the introduction of septic material or microbes into the system is fraught with very great danger to the patient. During labour and the puerperium or childbed period, a woman's system is very much below par, and therefore every endeavour must be made to prevent the introduction of any septic material.

When dealing with the puerperium and its complications, we shall discuss more fully the actions of the microbes, but, in the meantime, we shall speak about the substances which are used to destroy these microbes or their products. These are chemical substances, and are known as antiseptics.

Semmelweis was the first to use antiseptics in midwifery work, years before they were used in general surgery. He used solutions of chloride of lime and chlorine water for disinfecting his hands and the hands of his students, and was able to lessen the mortality in his wards markedly. To Lord Lister we owe the inestimable boon of antiseptic treatment. He first introduced it to the world here in the Royal Infirmary of Glasgow.

The substance first used by Lister was **carbolic acid,** and it still remains one of the best antiseptics we have. The pure acid is not used except to burn foul sores, as it

is a powerful poison. The solutions are used in varying strengths. For disinfecting the hands, 1 part in 20, or 1 ounce to a pint of water is often used. If the hands are much in it, it will affect the skin and cause chapping. For douching purposes, 1 in 40, or half an ounce to a pint is a good strength. It is often used much weaker.

Perchloride of mercury or **corrosive sublimate** is perhaps the most powerful antiseptic we have, but it is a most powerful poison, and must be used with care. For disinfecting the hands, 1 in 1000 is frequently used, but for douching purposes it should never be used at this strength; 1 in 2000 is as strong as it should ever be used in this way. It combines with the secretions of a wound, and deposits on the surface, and will become absorbed and may poison the patient. To prevent this, a perchloride of mercury douche should be immediately followed by a douche of water which has been boiled, *i.e.* sterilized water, which will wash the greater part of the deposit off the surface. A solution of 1 to 4000 is quite strong enough for a nurse to use. The solution should never be made in a metal vessel, as the mercury is deposited on the metal and the antiseptic power destroyed. Enamelled, porcelain, or glass vessels should be used. It is well to remember that this solution will blacken metal instruments, so they should not be placed in it.

Tabloids or soloids are now put up in a convenient form for the making of solutions at the bedside. A nurse must be very careful of these tabloids, and not leave them where children or others may find them, as they may easily be mistaken for sweets. If one were swallowed, the result would be fatal.

Creolin is used in the strength of about 1 in 300 (half a teaspoonful to a pint), and forms a milky solution.

Lysol is used in the the strength of about 1 in 100

(a teaspoonful or a teaspoonful and a-half to a pint). It forms a clear slippery solution, and can be used for lubricating the hands or instruments, so that vaseline or oil can be dispensed with for examination purposes. This is of importance, because vaseline or oil, even when combined with an antiseptic like carbolic acid, unless kept in a collapsible tube, is sure to become septic and prove a serious source of danger to the patient if introtroduced on the fingers or instruments.

Boracic acid in solution is non-poisonous, but it is not a powerful antiseptic. It is very useful for washing the eyes of the new-born infant.

Iodine is sometimes used, a teaspoonful of the tincture to the pint, and there are many others, such as izal, etc., of the same nature as creolin.

Condy's fluid, a solution of permanganate of potash, is a well known non-poisonous antiseptic, but it is not very powerful. Solutions of chloride of lime or chlorine we have already mentioned as having been used by Semmelweis. The strong smell is a great objection, but for disinfecting water-closets, drains, etc., there is nothing better than chloride of lime.

Iodoform alone, or combined with boracic acid is a powerful antiseptic powder. It is used for dusting over wounds, such as tears in the perineum or vagina. Iodoform gauze is frequently used for plugging the vagina or uterus. The gauze is impregnated with the powder.

Carbolic acid and perchloride of mercury, combined with vaseline or glycerine, are used for lubricating the fingers or instruments. They should never be kept in an open-mouthed pot or bottle. If a solution of lysol is used, they can be dispensed with, and we strongly recommend this.

Cotton wool, lint and gauze are impregnated with carbolic acid, salicylic acid, boracic acid, or corrosive sublimate, to form antiseptic dressings. Antiseptic diapers

may be made from any of these. Tow, impregnated with carbolic acid, is very useful for swabbing the external parts with during labour.

Antiseptic treatment consists in the application of antiseptics to a wound in the form of solutions, and the exclusion of air from the wound by an antiseptic dressing. Of late years a new method has arisen, *i.e.* the aseptic method. Asepsis means without sepsis.

By the **antiseptic method** you strive to destroy or get rid of any organisms which may find their way into the wound, but there is this drawback, that the powerful lotions you require to use have a somewhat destructive action on the raw tissues they come in contact with. By the **aseptic method** you strive to prevent any of the organisms from entering the wound. No strong solutions are applied directly to the wound, and the tissues are therefore not injured. To carry out such a method, the part which is to be operated upon must be rendered thoroughly aseptic for some distance round where the incision is to be made; the hands of those touching the wound, or any of the instruments being used, must be thoroughly sterilized or free from septic organisms; the sponges, dressings, etc., must also all be thoroughly sterilized. In surgical cases, where the aseptic method can be used, much better results are got than with the antiseptic, so that the aseptic method is displacing the antiseptic.

Can the aseptic method be applied to midwifery work? We believe it can, and, from a large personal experience, can say that it is the much better method.

In aseptic midwifery, just as in aseptic surgery, everything which touches the patient in the field of operation must be sterilized or rendered aseptic, and the field of operation must be in that condition to begin with, and must be kept so during the whole time of the labour and lying-in period.

How is this to be accomplished? We shall first deal with the hands. Under ordinary circumstances, the hands are very septic, and if the unwashed hand be introduced into the womb, sepsis will in all probability be the result. The hands and forearms, then, must be sterilized or rendered aseptic before any internal examination of the patient is made.

To thoroughly sterilize your hands and forearms, you must bare the arms to the elbows and wash them with warm water and soap, scrubbing them thoroughly with a clean nail brush. Special attention must be paid to the finger nails, which must be kept short. When the hands and arms have been thoroughly washed, they are laved with turpentine, which removes all traces of soap or grease, and is in itself a powerful antiseptic. The turpentine is washed off with methylated spirits, and then the hands and arms are bathed in a strong antiseptic for a few minutes. Perchloride of mercury, 1 in 1000, or carbolic acid, 1 in 20, are about the best antiseptic solutions to use. The hands will now be as nearly aseptic as you can render them, and you can touch a wound or make an internal examination without any risk. You must bear in mind that your hands will at once become septic if you touch anything which has not been sterilized, such as your own face, or clothing, or any part of the patient outside of the field of operation. If you do touch anything, you must at once soak your hands in the antiseptic lotion.

In private midwifery work, the turpentine and methylated spirits are generally dispensed with; thorough washing with soap and water, and then soaking in the antiseptic, is the usual routine.

How to render instruments, etc., perfectly aseptic.—This can be done by soaking them for some time in 1 in 20 carbolic lotion (perchloride of mercury would blacken metal instruments); but there is a much quicker and better

method, viz., by boiling them for a few minutes. Forceps, etc., should be made all metal. Wooden handles would be affected by boiling. A nurse will only have a glass douche nozzle, catheter, scissors, and a nail brush, which can all be boiled. A gum elastic catheter, of course, would not stand boiling more than once or twice, and therefore it should not be used. The dressings or diapers can be boiled or sterilized by steam; the latter method is used in hospitals, but in private work it is not convenient. Aseptic diapers and obstetric bedsheets are now supplied by different makers at a very small cost, and these should be used.

The third great essential is, that the field of operation must be rendered aseptic. We have to deal with the external genitals, the vagina and uterus. The external parts are septic, the same as any other part of the surface of the body, but how about the vagina and uterus?

Many experiments have been undertaken to find out whether the uterus and vagina are aseptic or free from septic organisms at the onset of labour. Under ordinary conditions, the uterine contents are absolutely free from any of these organisms. In the secretions of the vagina, in the vast majority of cases, no septic organisms are found, but many different kinds of what are known as non-pathogenic organisms are present. These do not give rise to septic mischief. On the contrary, and this is of very great importance, they actually can and do destroy any septic organisms which become deposited in the passage. Of course they can only destroy a certain amount, and, if overpowered, the battle will go against them. Not only, then, is the vagina, as a rule, free from septic organisms, but it possesses in these swarms of friendly or non-pathogenic organisms a great protective or self-cleansing power. Antiseptic vaginal douches used to be given during labour, before the child was born, with the idea of thoroughly

removing any septic organisms that might be in the canal. You can see that if the vagina, as a rule, is aseptic at the onset of labour, such a proceeding is not necessary, in fact, is more likely to do harm than good, because it will destroy or remove from the vagina the protective organisms. Of course there are occasional cases where the vagina is septic before labour, as in cases of gonorrhœa, and in these an antiseptic douche may be required, but in the vast majority of cases it will do more harm than good.

As the vagina and uterus are aseptic, we have only to deal with the external parts, which are undoubtedly septic.

How to prepare a patient for a vaginal examination or operation.—The buttocks and external genitals must be thoroughly washed with soap and water, and then with an antiseptic solution. The vulva must be thoroughly cleansed with swabs of cotton wool, or carbolic tow, dipped in the antiseptic. Turpentine and methylated spirits cannot be applied to these parts, as the smarting would be too great. Lysol solution is the best, about a teaspoonful to the pint, as it makes a soapy solution. If it is used too strong, it causes smarting.

How to give a vaginal douche.—A vaginal douche is rarely required before the child is born, but it has to be given in some cases immediately after labour, and in others during the puerperium. The old method was by using a syringe (a Higginson's enema one with a long elastic nozzle). This is not a good method, as the syringe gives an intermittent flow, which is not so effectual as a continuous one. The gum elastic nozzle cannot be easily sterilized, and it may be a source of infection. Again, a syringe which has been used to give a rectal injection should never be used for vaginal douching, as it is almost sure to be septic. The best form of douche apparatus consists of a glass, metal, or rubber reservoir, which will

hold from one to several pints, several feet of rubber tubing attached to the bottom of it, and a glass vaginal nozzle. There should be a clip or stopcock on the tube. The nozzle should be made of glass, as it can be so easily sterilized by boiling.

There is a douche apparatus known as the Rotunda douche, which is a convenient one to carry. It consists of several feet of rubber tubing, with a ball in the centre for expelling the air from it. It has to be used with a jug, and acts as a syphon.

When the reservoir is filled, it should be hung up two or three feet above the patient, so as to give a good free flow. All air should be expelled before the nozzle is introduced into the vagina.

The best position for the patient to lie in, is on her back, with her hips at the edge of the bed and her legs raised (the lithotomy position). The bed should be well protected by a waterproof sheet, so placed as to carry the fluid into a bath or tub on the floor. The patient can hold her legs up by grasping the top of her stockings, or a folded towel passed beneath the bend of her knees, or she may rest her feet on two chairs.

The usual way a nurse gives a douche, is with the patient on her back in the bed, with her legs drawn up and the hips raised on a bed-pan. The bed should be well protected with a waterproof sheet. It is sometimes given with the patient on her left side with the hips at the edge of the bed. The back position is, however, preferable.

The external genitals must first be carefully cleansed with an antiseptic solution. The first few ounces of the fluid should be allowed to run over the external parts, so as to thoroughly cleanse them before the nozzle is inserted into the vagina. The reservoir or can must not be raised very high above the patient, or the fluid will be thrown into the vagina with too great an amount of force. When

the nozzle is withdrawn, a certain amount of fluid will be retained in the vagina, and this should be expelled by pressure over the abdomen, or a napkin should be applied to receive it and prevent the bed being wetted when the patient lies down, as it will then gush out.

An intra-uterine douche is given in the same way, only a longer nozzle is used, and it is passed right up to the fundus. It is an operation which a nurse should not attempt.

How to pass a Catheter.—A metal or glass catheter should be used, and not a gum elastic one, as the latter cannot be sterilized. The catheter should be boiled before it is used, and then dipped in a little lysol solution to render it slippery. The patient should lie on her back, with her legs drawn up and thighs separated, or she may lie on her side with her hips at the edge of the bed. The vulva must be thoroughly swabbed with lysol or creolin, and special care be taken to wipe away all discharge from the meatus urinarius. The catheter is then gently passed in and the urine drawn off. You must see the parts plainly to do it properly. When the flow ceases, place a finger over the end of the instrument and withdraw it. By plugging the end, you prevent the urine in the catheter trickling on to the patient or bed.

The catheter can be passed by touch without exposing the patient, but in this way you are almost sure to carry in some of the discharge, and it may set up violent inflammation of the bladder.

CHAPTER X.

ABORTION—THREATENED—INEVITABLE—INCOMPLETE—MISSED.

By the term **abortion** we mean the expulsion of the uterine contents before the fœtus is viable or able to live apart from its mother, *i.e.* before the seventh month. Strictly speaking, it should be called an abortion only until the placenta is fully formed, *i.e.* until the end of the third month, and from that time until the seventh month, a **miscarriage,** but this is an unnecessary distinction for a nurse. Expulsion after the seventh month, but before full time, is known as a **premature labour.**

To the patients themselves the term **abortion** should not be used, as in their minds it is usually associated with criminal practices. The common terms in use are "mishap" or "miscarriage."

Frequency of abortions.—Abortions are very frequent among all classes of women. One out of every five pregnancies is said to end before full time. Multiparæ are more prone to abort than primiparæ. Some women abort very frequently in successive pregnancies. We have known a case to have had eighteen successive abortions.

Time of occurrence.—The third month is probably the most frequent time. The time generally corresponds with the time the patient would have been unwell if she had not been pregnant. At such a time the uterus becomes hyperæmic, that is, more blood flows to it than at other times, so bleeding is apt to occur.

Conditions present in the uterus in the early months.—A thorough understanding of the conditions present in the uterus until the placenta is formed, *i.e.* before the end of the third month, will enable you to clearly understand the subject. You have already been told how the mucous membrane becomes much thickened to form the deciduæ vera and serotina, and how a fold, the decidua reflexa, encloses the ovum. At first there is a space between the reflexa and vera, but as the ovum grows, the former is pushed out against the latter, and the two blend. The outer membrane of the little ovum, the chorion, at this stage is covered all over with minute projections called villi, which embed themselves in the deciduæ reflexa and serotina. The minute vessels in these villi nourish the ovum. As soon as the placenta begins to form, the villi embedded in the reflexa begin to shrivel up or atrophy, while those in the serotina increase in size and form the fœtal part of the placenta. When the placenta is fully formed, all the villi which were embedded in the reflexa have disappeared, and the deciduæ reflexa and vera are much thinned out. Until the placenta is formed, the attachment of the ovum to the uterus is only through these very minute villi, and a sudden jar may tear some of them through and cause bleeding, and if a clot forms it will act as a foreign body, which will irritate the uterus and set up contractions, which, if at all strong, will cause the expulsion of the contents. You can thus see how abortions are so frequent in the early months, and especially during the third month before the placenta is fully formed. Another important point to bear in mind is that before the placenta is formed the deciduæ must come away as well as the ovum before the uterus is emptied. This is of the utmost importance, because not unfrequently the small ovum, covered all over with little shaggy villi, is expelled alone, while the most important part, viz., the deciduæ, is left

behind. After the placenta is formed, it and its membranes, as well as the small fœtus must come away. The fœtus is often not seen at all, as it escapes early, in the clots.

Size of the Ovum.—At the end of the first month it is the size of a pigeon's egg; at the end of the second month, the size of a hen's egg; at the end of the third month, the size of a goose's egg.

Causes of Abortion.

These may be taken up under four headings, viz.:—Fœtal, Maternal, Paternal, and Accidental.

1. **Fœtal.**—(1) Diseases of the chorion, amnion, placenta, or cord. (2) Sudden loss of liquor amnii, which may be caused by an accident, or intentionally, by the passage of an instrument. (3) Anything which causes the death of the ovum.

2. **Maternal.**—(1) Syphilis. This is the commonest cause of all among a certain class. It is apt to cause repeated abortions. (2) Diseases of the uterus, especially inflammation of the mucous membrane (endometritis), which affects the deciduæ. (3) Displacement of the uterus. (4) Tumours of the uterus or other organs in the pelvis. (5) Serious constitutional disease, as consumption, inflammation of the kidneys, or heart disease. (6) Febrile conditions from any of the fevers, such as scarlet fever. (7) Poisons, such as phosphorus or arsenic.

3. **Paternal.**—(1) The commonest cause on the part of the father is undoubtedly syphilis, and as the ovum becomes syphilitic it becomes a fœtal cause also. The mother is also liable to become affected, so the disease may act in two ways. (2) Extreme youth or age of the father is also a cause.

4. **Accidental.**—(1) Physical, by direct violence from a

blow, fall, or injury of any kind. In some cases a very slight accident may cause it, while in others the women may be very seriously injured, *e.g.*, by kicks on the abdomen or severe crushing, and yet the pregnancy not be interfered with. Indirect violence from over-exertion, *e.g.*, from riding on horseback, on a cycle, in a cab or railway train, dancing, playing tennis, etc., and among the working classes from over-work, such as lifting heavy weights, or over-stretching in hanging up clothes, etc. A very severe fit of vomiting, coughing, or sneezing may also cause it. Excesses in eating, drinking, or coitus are also given as causes. (2) Mental. Any mental shock, such as the sight of an accident, sudden bad news, etc., or violent indulgence of the passions, may act as an indirect cause through the nervous system. The shock of a big operation may also be a cause.

Procured abortion.—As we have already seen, occasionally cases occur in which it is justifiable in the interests of the patient to have an abortion brought on, as in bad cases of chorea, etc., but this is quite outside of a nurse's duties. Unfortunately, many women know that it is possible for them to get rid of the products of conception, and they have no hesitation in asking doctors and nurses to perform this illegal operation upon them. Under no circumstances should a nurse attempt this, or give drugs to a woman to bring it about. Not only is it morally wrong, but it is a serious crime, and if the woman dies, as occasionally happens, the person who did the operation, or administered the drugs, is guilty of murder or manslaughter.

Varieties of abortions.—There are two main varieties—threatened and inevitable. The latter may again be divided into complete, incomplete, and missed.

Signs and symptoms.—In some cases the patient may have a feeling of sickness and vomiting, but the chief indications are pain and hæmorrhage. If she has only gone

a few days over her time, she may think it is merely a prolonged and painful menstrual period which has been delayed for a few days. The pain is felt in the pelvis, and is usually intermittent in character, very like early labour pains. It is caused by contractions of the uterus. The hæmorrhage may come on before the pain, or the pain may be felt first, but in a little you have the two together. The hæmorrhage may be intermittent, recurring at intervals of several hours or even days, or it may be continuous like a menstrual flow. There may be clots expelled, or in some cases, only a free serous flow at first, the clots being retained in the uterus. As a rule the bleeding is not alarmingly profuse, but it may continue for a very long time and weaken the patient markedly. The pain in some cases is not very severe, while in others the women will complain that it is as bad or worse than with a full-time labour.

As soon as the uterus is thoroughly emptied the pain will cease and the hæmorrhage also, but there will still be some lochial discharge as after a full-time labour, though not as profuse or prolonged.

Threatened abortion.—The pains are slight and irregular, with a considerable time between them. The hæmorrhage will not be great, and on making a vaginal examination the os will be found closed or only slightly opened.

Inevitable abortion.—The pains are stronger and more regular, the bleeding much more profuse, and on examination the os will usually be found to be dilating. The ovum will often be felt to be protruding. The pains become stronger and at shorter intervals, until the uterine contents are expelled in part or entire.

Complete abortion.—When the whole contents of the uterus are expelled, it is known as a complete abortion. The pains and hæmorrhage at once cease.

Incomplete abortion.—Only a portion of the contents come away, leaving some behind. In the early stages,

before the placenta is formed, the small ovum alone may come away. It will be in the form of a small sac covered all over with shaggy projections, the villi of the chorion. In such a case the complete decidua is left behind. In another case the ovum and the decidua reflexa may come, leaving the deciduæ vera and serotina behind. After the placenta has formed, it and the membranes in whole or in part may be left behind. The part left behind may come away entire or in pieces, and until it is all away there will be considerable discharge. A small piece of placenta is sometimes left behind, and it forms what is known as a placental polypus. Bleeding will recur from time to time so long as it is left behind. So long as there is anything in the uterus the woman will run considerable risk from repeated hæmorrhage and also from sepsis. The inflammation set up by the septic absorption will damage her tubes, ovaries, peritoneum, or uterus.

Missed abortion.—In some cases the ovum perishes, but is not expelled at once. It may be retained in the uterus for a considerable time. An abortion is threatened at the time the ovum perishes, but this threatening passes off. The symptoms of pregnancy usually disappear except the amenorrhœa, but the uterus does not increase in size as it should. The ovum may be shrivelled up or it may form a fleshy mole. This may happen to one ovum in a twin pregnancy, while the other goes on developing until full time, when you get a live child and a blighted ovum expelled.

Prognosis.—The immediate risk to a woman is from the hæmorrhage, but this is seldom very great, except in incomplete abortions, when the repeated losses may weaken her very much and even cause her death. The greatest risk is from sepsis, which may cause her death or leave her more or less an invalid by the inflammation damaging her tubes, ovaries, peritoneum, or uterus.

Displacements are very common after abortions, especially if the patient does not keep her bed for a week or so.

Diagnosis and Treatment of Abortions.

The first thing you have to satisfy yourself about is that the woman is really pregnant, and the second thing is whether it is a threatened or an inevitable abortion.

Threatened abortion.—In the threatened the bleeding will be small in amount, the pains slight, and the os closed.

Treatment.—Put the patient to bed and keep her very quiet, on low cool diet. If the bowels are loaded have them cleared out by a gentle laxative or an injection. Certain drugs, of which opium is the best, would be given by a doctor, but a nurse should not order anything of a poisonous nature. The patient must be kept perfectly quiet for some days until all signs and symptoms have passed off. She must be warned not to over-exert herself, and that she must rest when her next two or three periods would be due. The whole aim of the treatment is to quiet uterine action.

Inevitable abortion.—The pains will be strong and regular, the bleeding copious, and the os will usually be dilated, so that the ovum can be felt protruding.

Treatment.—In such a case your aim is to get the uterus emptied as soon as possible. If the os is well dilated, and the ovum fully separated, you may be able to remove it with your fingers. By compressing the uterus firmly between two fingers in the vagina, and a hand on the abdomen just above the symphysis, you may be able to squeeze the ovum out of the uterus. When the os is not much dilated, ergot is given in the hopes of its setting up strong uterine contractions and causing the uterus to expel its contents. In many cases that does quite well, but it cannot be relied on. The best method of treatment in such a case is to plug the vagina with an aseptic plug.

This should be left in six or eight hours, and on its removal the ovum will frequently be found lying on the top of the plug. If it is not, the plug may be renewed, after douching out the vagina. A nurse should not attempt the treatment of such a case alone. Everything that comes away should be carefully preserved so that the attendant may be able to decide whether or not the uterus is completely empty.

Incomplete abortion.—In such a case there is still something in the uterus. The hæmorrhage will continue or recur from time to time with more or less pain. By a vaginal examination you may be able to make out that there is still something in the uterus, but the os will often be found closed. If the woman is septic you will find a foul discharge present.

Treatment.—A nurse should not undertake such a case alone. The uterus will need to be cleared out, and this is best done under chloroform, when the retained portion may be removed by the finger, or by what is called a flushing curette. The uterus should then be thoroughly douched out with an antiseptic lotion.

After treatment.—In all cases after the uterus is cleared out the patient must be kept in bed for a week or so, and treated just in the same way as after a full-time labour. If there is any smell from the lochial discharge, and her temperature rises, antiseptic vaginal douches will be necessary. If the uterus has to be washed out, the nurse must not attempt that herself. The treatment during the puerperium will be fully dealt with later on.

The treatment of a **missed abortion** is not for a nurse to undertake, unless the uterus be emptying itself spontaneously, when the treatment will be exactly the same as for an ordinary abortion.

CHAPTER XI.

THE FŒTUS—FŒTAL HEAD—DIAMETERS—ATTITUDE—PRESENTATION—POSITION.

While the child is still in the uterus it is called a fœtus. A mature or full-time child is usually about 20 inches long, and weighs, on an average, between six and seven pounds. The size varies a good deal, however; some weigh ten or twelve pounds, or even more, but these are exceptionally large children. The first child is usually smaller than subsequent ones, and when there are twins they are usually small. Male children, as a rule, are heavier than female ones.

The newly-born mature child has a rosy skin, covered over more or less with a white greasy substance called **vernix caseosa,** the finger nails project beyond the tips of the fingers, and the head is covered with hair. It usually cries loudly as soon as it is born, and moves its arms and legs freely. Its legs will be somewhat curved, giving the appearance of what are termed bandy legs. They may remain somewhat drawn up on the abdomen, and the feet may be bent upwards slightly on to the shins. These conditions are due to the bent attitude the fœtus has occupied in the uterus; this soon passes off. In a short time the child's bowels should move, and it should pass urine. The first motions are dark and tarry looking. This substance is known as **meconium.**

As the **head** is the largest part of the child, and the part which usually causes the most difficulty in labour,

we must study it carefully as to size and shape, and compare it with the size and shape of the pelvis through which it has to pass.

The skull of the fœtus differs from that of the adult in the bones not being firmly joined together. Between the various bones the junctions are formed by membranes, which allow of the bones moving fairly freely, so that the head can be compressed by one bone sliding over the other. The head will thus mould or change its shape to suit the shape of the pelvis through which it passes.

The cranial bones are named as follows:—Two **frontal** or forehead bones in front; behind these, two **parietal** bones, which form the sides and top of the skull; two **temporal** bones, one at either side below the parietal bones; and the **occipital** bone, which forms the back part of the skull.

The membranous junctions between the bones are called **sutures.** There are four of these, viz., the **frontal,** between the two frontal bones; the **sagittal,** between the two parietals and continuous back from the **frontal;** the **coronal,** between the parietals and frontals; the **lambdoidal,** between the parietals and the occipital bones.

Where the sutures meet are two large membranous spaces. known as **fontanelles.** There are the anterior and posterior. The **anterior fontanelle** or **bregma,** the larger of the two, is diamond or lozenge-shaped, and measures about half-an-inch in length. It is situated at the spot where the coronal suture crosses the junction of the frontal and sagittal sutures. The **posterior fontanelle** is much smaller, and triangular in shape. It is situated at the back end of the sagittal suture, at its junction with the lambdoidal. It can be enlarged by depressing the tip of the occipital bone beneath the parietals. These fontanelles are very important landmarks, as they enable

you to make out the position of the head. It is important to be able to distinguish between them by feel. The anterior one is the larger, is diamond-shaped, and has four sutures running out from it, viz., the frontal, sagittal, and two halves of the coronal. The posterior one is the smaller, is triangular in shape, can be enlarged by depressing the tip of the occipital bone, and has three sutures running out from it, viz., the sagittal and the two halves of the lambdoidal.

The portion of the top of head lying between the two fontanelles is known as the **vertex.**

As already said, the free movement of the bones allows of compression or moulding of the head during labour. The occipital bone slips under the posterior ends of the parietals, while the frontals slip under the anterior ends, thus lessening the size of the head from before backwards, while one parietal bone slips over the other, lessening the size from side to side.

Diameters of the fœtal head. — There are certain measurements of the head taken, called diameters. The longest antero-posterior diameter, *i.e.* from back to front, the **occipito-mental** is taken from the tip of the occipital bone to the tip of the chin (5 inches); the next in length, the **occipito-frontal,** is from the occiput to the root of the nose ($4\frac{1}{2}$ inches); while the shortest, the **sub-occipito-bregmatic** extends from the nape of the neck to the anterior fontanelle (4 to $3\frac{1}{2}$ inches). It measures 4 inches when the head is not bent on the chest, as the front end of the diameter is then taken from the front of the anterior fontanelle, but when the head is much flexed or bent it measures $3\frac{1}{2}$ inches, as the front end then lies at the back part of the fontanelle. The greater the amount of the flexion or bending of the head, the shorter this diameter is. The importance of this will be seen when we are dealing with labour.

Transverse diameters.—The measurements from side to side are two in number, viz., the **biparietal,** between the widest part of the parietals ($3\frac{1}{2}$ inches), and the **bi-temporal,** between the temples ($2\frac{1}{2}$ inches).

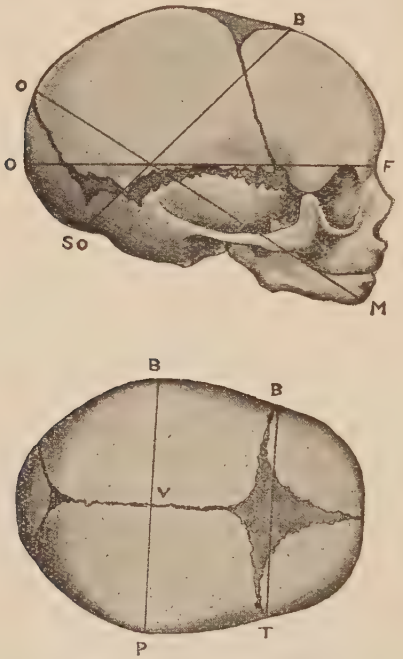

FIG. 12.—The fœtal skull. (Fothergill.)
O.M. = Occipito-mental diameter.
S.O.B. = Sub-occipito-bregmatic diameter
O.F. = Occipito-frontal diameter.
B.T. = Bi-temporal diameter.
B.P. = Bi-parietal diameter.
V. = Vertex.

Vertical diameters.—There are two vertical or up and down measurements, viz., the **fronto-mental,** from the chin to the top of the forehead (3 inches), and the **cervico-bregmatic,** from behind the angle of the jaw to to the anterior fontanelle (3 inches).

All of these diameters can be considerably lessened

by the moulding of the head during labour. Some heads are broader than others and do not mould so well, and the head of a male is usually slightly larger than that of a female. Among highly civilized races the heads are larger than among savages. This is one reason why labour among civilized women is much more difficult than among primitive people.

There are certain terms used in connection with the fœtus which require definition.

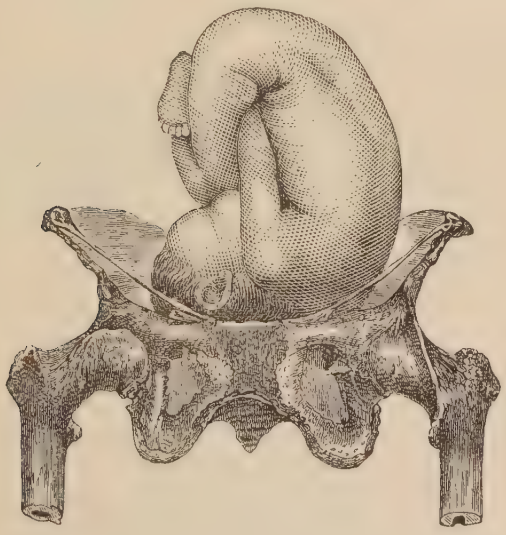

FIG. 13.—Attitude of child in First Position, L.O.A. (Hodge.)

The **attitude** means the relation of the different parts of the fœtus to each other. The fœtus is developed in a bent or flexed attitude. The head and arms are bent on the chest, the thighs on the body, the legs on the thighs, and the feet on the front of the legs, while the trunk itself bends forwards. This arrangement allows of the packing of the fœtus into as small a space as possible.

The **presentation** of the fœtus means the part which lies over the os uteri and is that part felt by the examining finger, *e.g.*, vertex or head presentation, transverse or shoulder presentation, breech presentation, face presentation, etc.

The **position** of the fœtus means the relation which the presenting part bears to the pelvis. There are four principal positions: right and left anterior, and right and left posterior, according as the presenting part lies to the right or left side of the pelvis, to the front or to the back.

The attitude of the fœtus is practically always the same, more or less flexed, but the presentation and position may, and do frequently, change during pregnancy. In the vast majority of cases it is the head which presents, most frequently with the occiput coming first, turned towards the left side and front of the pelvis, *i.e.* in the left anterior position.

CHAPTER XII.

Labour.

By the term **labour** is meant the expulsion of the uterine contents. It is a **mature** or **full-time labour** when the fœtus has reached its full development, and a **premature labour** if before full time, but not before the seventh month. From the seventh month the child is viable, *i.e.*, it may live, if born.

A **full-time labour** usually occurs 280 days from the first day of the last menstrual period, *i.e.*, at the time which would correspond with the tenth menstrual period.

There are three principal factors concerned in labour, viz., the **powers,** the **passages,** and the **passenger.**

The **powers** are the contractions of the uterus, known as the **primary powers,** and the contractions of the abdominal muscles, known as the **secondary powers.** The uterine contractions are involuntary, *i.e.*, they are not under the control of the will; while the contractions of the abdominal muscles are voluntary, *i.e.*, they can be controlled by the will, although towards the very end of labour, as the child is being expelled, they practically become involuntary. The powers are concerned with dilating or opening up the lower part of the uterus and the cervix and expelling the uterine contents. The weight of the uterine contents assist by gravity, especially during the early part of labour while the woman stands or walks about.

The **passages** are the lower uterine segment, the cervix, the vagina, and the bony pelvis round all.

The **passenger** is the fœtus with placenta and membranes.

Labour is usually divided into three stages.

The **first stage,** or that of dilatation, lasts from the commencement of true labour pains until the os uteri is fully dilated.

The **second stage,** or that of expulsion, lasts from the full dilatation of the os uteri until the child is born.

The **third stage,** or that of delivery, lasts from the birth of the child until the placenta and membranes are expelled.

Premonitory Symptoms.—During the last two or three weeks of pregnancy there are certain premonitory symptoms, or indications, that labour is near at hand. The uterine tumour sinks and allows of greater freedom in breathing. The fundus of the uterus will be felt to have fallen somewhat below the tip of the breast bone. This is known as "the lightening before labour." While the pressure upon the lungs is lessened, allowing of free breathing, that upon the bladder and rectum will be increased, so that there will be frequency of micturition, and constipation will be increased. Walking may be rendered difficult, and if varicose veins, or piles, are present, they will become more swollen.

The cervix becomes shortened or taken up into the uterine cavity by the gradual expansion of the lower uterine segment. At the same time there will be an increase in the mucous discharge from the vagina, which becomes blood-stained at the onset of labour. This blood-stained discharge is commonly known as the "shows."

Many patients are troubled with pains, especially at night, for the last two or three weeks. Sometimes these pains are so bad that the patient imagines the labour has really come on. These pains are known as **false,** while the proper labour pains are known as **true** pains. It is important to be able to distinguish between them. True pains, or contractions, cause the mouth of the womb to dilate and force down the fœtus. The false have no

effect in this way. They are generally caused by irritation in the bowels, or from an over-distended bladder, or from the patient being over-fatigued from standing too long. They recur at irregular intervals, and the uterus does not harden regularly as when the **true pains** are on.

A vaginal examination during a false pain will show that the os uteri is not being opened up, neither is the presenting part being pressed down.

False pains do not assist labour. They cause much distress to the patient and ought to be relieved.

Treatment.—Remove the cause. If the bowels are loaded give a dose of opening medicine or an injection. A doctor would probably order an opiate as well. If there is retention of urine, the bladder must be emptied, by means of a catheter.

True pains are first felt in the abdomen at intervals of perhaps half-an-hour or even longer. The suffering, or pain, is caused by the contractions of the uterine muscle fibres, and when we use the word pains in connection with labour we mean uterine contractions. They are synonymous terms. At first, then, the pains recur every half hour or so, but as labour advances they come much more frequently—every 15 or 10 minutes and then every 5 minutes, and finally every 3 or 4 minutes. The rest between the pains is a wise provision of nature. If they were continuous the woman would quickly become exhausted and the fœtus would be killed by the continuous pressure. As they increase in strength and frequency the patient begins to feel them in her back and shooting down towards the front. If you place your hand upon the abdomen during a pain you will feel the uterus harden and come forward.

During the first stage the pain feels of a gnawing or grinding nature. Some women suffer greatly, especially those of a highly sensitive nature. They will be very

restless and cry out a great deal. Others again seem to suffer very little and give practically no indication of what is going on, except perhaps by a drawing together of the face. During this time the lower part of the uterus and the cervix is being opened up or dilated. As the lower uterine segment stretches, the membranes attached to it get separated and project through the opening os, as the **bag of membranes** or **forewaters.** This bag of membranes acts as a splendid dilator and opens up the cervix gradually. In shape the bag is usually rounded, but it sometimes projects into the vagina like a sausage. This occurs when there is an abnormal presentation or a contracted pelvis. The contractions of the longitudinal fibres of the uterus tend to push the uterine contents down, and at the same time pull open the os.

If a vaginal examination is made during a pain the bag of membranes will be felt to become tense and the lips of the cervix firm.

When the os is fully dilated the membranes, as a rule, rupture and the forewaters escape. The whole of the liquor amnii does not escape, as part of it is dammed back by the head plugging the cervix, but in transverse or breech cases the presenting part does not do this so the whole fluid quickly escapes. Sometimes the membranes rupture early, even before the pains come on, while at other times they are so tough that they require to be ruptured artificially. Occasionally the ovum is expelled intact, *i.e.*, with the child completely enveloped in the membranes. They must be torn at once or the child will be smothered. Sometimes the child is born with a cap of membranes over its head. This is known as a "caul." The possession of a caul used to be considered lucky, and large sums were paid for them by the superstitious.

The second stage.—When the os is fully dilated and the membranes ruptured the second stage is entered upon.

The pains now become stronger and more frequent. The suffering is greater, and at the moment of expulsion of the child, may become so great that the woman may lose control of herself for a little and can hardly be held responsible for anything she may do. The pain is of a rending tearing nature.

During the second stage the secondary powers come into play. The woman holds her breath and contracts her abdominal muscles as much as she can in making expulsive efforts. This assists the uterine action very markedly.

Third stage.—After the child is born the contractions of the uterus continue until the placenta and membranes are separated and expelled. With the first child, pains, as a rule, are not felt after this, but in subsequent labours they are felt for from 12 to 36 hours afterwards, especially when the child is at the breast.

Effect of labour on the child.—Until the membranes rupture and the liquor amnii escapes the child does not suffer from pressure as the fluid prevents this, therefore, as a rule, there is no pressure upon the child until the second stage. If the second stage is too prolonged there is considerable risk of the pressure killing the child. As we have already seen the loose union of the bones of the fœtal head allows of its changing shape or moulding. In all cases in which the head presents it will be found more or less out of shape or asymmetrical, *i.e.*, with one side bigger than the other. In difficult and prolonged labours the moulding will be marked.

Caput succedaneum.—Besides the moulding of the head there is always a swelling of the scalp, known as the **caput succedaneum.** This forms on the part which presents or lies free in the os. This part is not supported, therefore the pressure from above forces the serum of the blood into it and causes it to swell. The position of the

caput succedaneum differs according to the position of the presenting part. In vertex or cranial presentations it is over the back part of the parietal bone which lies to the front. When any part of the child, other than the head, presents, the swelling will be on the part which presented and not on the head.

In a few days the head usually gains its normal shape and the caput succedaneum disappears, but until it has disappeared one can judge from it the way the child has presented.

The duration of labour.—A natural or normal labour should not last more than twenty-four hours from the onset of true labour pains. If it extends beyond this it is a **lingering** or **laborious** labour and much more dangerous to both mother and child. Twelve hours is about an average duration. It is usually longer with first than with subsequent children. Of the three stages the first is much the longest, averaging about eight to ten hours, though it may be much longer or much shorter. During the first stage so long as the membranes are intact there is practically no risk to mother or child in ordinary cases. The second stage may last only a few minutes, but about three hours in multiparæ and four hours in primiparæ is as long as it should be allowed to last. If it is allowed to linger on for hours the pressure upon the child may cause its death. The mother may become exhausted and the soft parts in the pelvis so injured by pressure from the presenting part that sloughing will occur a few days later. In such a case the bladder or rectum, or both, may be opened into. Septic absorption is also apt to occur.

The third stage is usually over in about fifteen or twenty minutes. If it is prolonged much beyond that the placenta is in all probability adherent, so you must send for assistance to have it removed.

CHAPTER XIII.

The Mechanism of Labour.

To throughly understand **labour,** we must study the movements of the presenting part of the fœtus as it passes through the pelvis. In ninety-five cases out of a hundred it is the head which presents; we shall therefore consider the head presentations first.

As we have already seen, the head may present in four different positions. The occiput is the part which leads, and is known as the **denominator,** *i.e.*, it denominates or gives the name to the presentation. The positions are numbered first, second, third, and fourth, according to the way the occiput is pointing. The first and second are anterior positions, and the third and fourth posterior.

First position (L.O.A.)—In the first or left occipito-anterior position, which is the most frequent of all, the occiput points towards the left acetabulum, and the sinciput or forehead towards the right sacro-iliac joint. The occipito-frontal diameter of the head thus lies in the right oblique diameter of the pelvis (Fig. 14, I.).

Second position (R.O.A.)—In the second or right occipito-anterior position, the occiput points towards the right acetabulum, and the sinciput or forehead towards the left sacro-iliac joint. The occipito-frontal diameter of the head thus lies in the left oblique diameter of the pelvis (Fig. 14, II.).

Third position (R.O.P.)—In the third or right occipito-posterior position, the occiput points towards the right sacro-iliac joint, and the sinciput or forehead towards the left acetabulum. The occipito-frontal diameter of

the head thus lies in the right oblique diameter of the pelvis. This is just the reverse of the first (Fig. 14, III.).

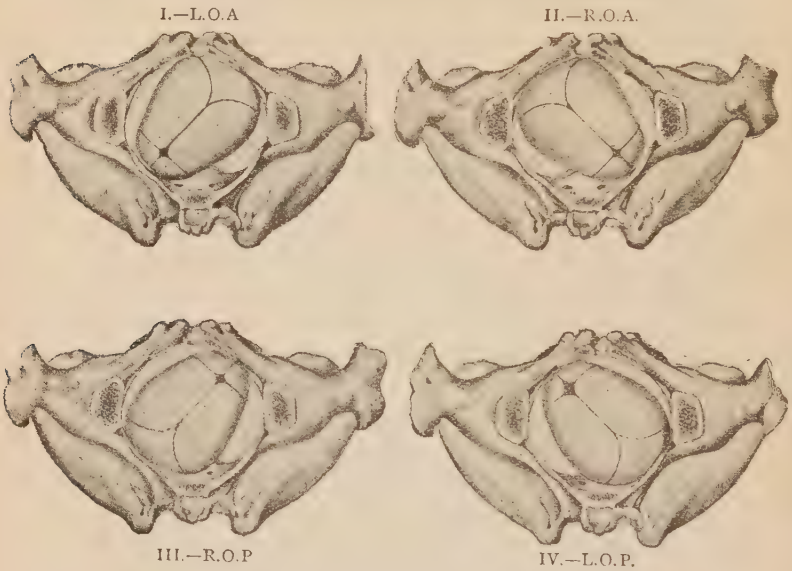

Fig. 14.—Diagram of 4 Vertex Positions from below. (Croom.)

Fourth position (L.O.P.)—In the fourth or left occipito-posterior position, the occiput points towards the left sacro-iliac joint, and the sinciput or forehead towards the right acetabulum. The occipito-frontal diameter of the head thus lies in the left oblique diameter of the pelvis. This is the reverse of the second (Fig. 14, IV.).

Of the anterior positions the first (L.O.A.) is by far the more frequent, and of the posterior, the third (R.O.P.). The third occurs more frequently than the second or fourth. The fourth is rare. Placing them in the order of frequency, we have the first, the third, the second, and then the fourth.

We shall first consider the movements of the head in

the first or L.O.A. position. The head which is somewhat bent or flexed on the chest, enters the pelvis or engages in the brim with its occipito-frontal diameter in the right oblique of the pelvis, the occiput pointing towards the left acetabulum, the forehead towards the right sacro-iliac joint, and the right parietal bone presenting. The contractions of the uterus force the head downwards and backwards through the cavity of the pelvis in the right oblique diameter. This movement of **descent** is continuous throughout the other movements which we are now to describe. We have already seen that the fœtus is developed in a bent attitude, so at the beginning of labour the head is somewhat bent or flexed on the chest. As soon as descent begins, and the head meets with resistance, **flexion** is increased until the occiput gets considerably in advance of the forehead. This is due to the steeper or occipital part of the head travelling quicker than the more sloping front part. The result of flexion is to bring the sub-occipito bregmatic diameter of the head into the oblique diameter of the pelvis, in place of the occipito-frontal, *i.e.*, to replace a long diameter of the head by a much shorter one, which will allow the head to pass more easily. The movement of **flexion** is a very important one, and the more marked it is the more easily will the head pass down.

When the flexed head has passed down through the cavity of the pelvis, the leading part of it, viz., the occiput, comes against the pelvic floor or perineum, and we then have the next movement, viz., **internal rotation.** The occiput turns forward, *i.e.*, towards the right under the pubic symphysis. This is caused by the elastic resistance of the perineum forcing the occiput in the only direction in which it can go, viz. forward to the vulvar opening. The result is that the sub-occipito bregmatic diameter of the head changes from the oblique

diameter of the pelvis into the conjugate at the outlet, *i.e.*, into the longest diameter at the outlet which of course allows of the head passing much more easily.

When the occiput comes under the pubic symphysis, the head gets caught there by the nape of the neck, and then we have the next movement, which is known as **extension.** It is the undoing of flexion. The chin gradually leaves the chest, the head being thrown back. In this way the top of the head, the forehead, and then the face of the child, is forced over the perineum, the back of the neck slips round the symphysis pubis, and the head is born. Extension is the result of the force from above driving the head downwards, while the perineum resists, so the head must pass forwards in the axis of the outlet.

The next movement is known as **external rotation** or **restitution.** The head turns round so that the face of the child which was looking directly towards the mother's anus comes to look towards her right thigh or towards the ceiling, when the patient is lying in the usual position on her left side. The head has nothing to do with causing this. It is caused by the leading or right shoulder passing forward under the pubic symphysis, just as the occiput did, but in the opposite direction, viz., towards the left. The right shoulder gets caught under the symphysis, and the left one sweeps over the perineum, and the shoulders and arms are born. The body is then expelled without any difficulty, as a rule.

To recapitulate: we have flexion, descent, increase of flexion, internal rotation, extension, and finally, external rotation, and birth of the body.

If you bear in mind the following rule, it will simplify matters very much in considering the mechanism of all presentations and positions, viz., whichever part of the fœtus is leading and strikes the perineum first, passes forwards under the symphysis pubis.

Mechanism of the third stage.—During the third stage the placenta and membranes are separated and expelled. The placenta, which is from 6 to 8 inches in diameter, is attached to a portion of the uterine wall of corresponding size. Now, when the child is born, the size of the uterine cavity is much reduced, and the site of attachment of the placenta shrinks with the rest of the wall. With each pain during the third stage the uterus becomes smaller and smaller. The placenta itself cannot shrink much in size, and, as its site does, separation is bound to occur. The membranes are separated in the same way. When separation has occurred, the uterine contraction expels the placenta into the vagina, and the birth of it is completed by the expulsive powers of the abdominal muscles. It may come edgewise or doubled on itself. The membranes follow it. More or less clot comes with the placenta.

How bleeding is prevented.—When the placenta separates the large blood sinuses in the uterine wall are opened into, but in the vast majority of cases the bleeding is comparatively slight. During the contractions of the uterus, the various muscle fibres in it shorten very much, and when the contractions pass off they lengthen again in the same way as any other muscle fibres, but with this difference, that they do not return to exactly the same length as they were before, but remain slightly thicker and shorter after each contraction. This permanent shortening is known as **retraction,** and this is the chief factor in preventing bleeding. The retraction of the muscular fibres, especially the interlacing ones, compresses and closes up the vessels which communicate with the uterine sinuses. Besides this, clots form in the torn sinuses themselves, and dam them up as it were. If the uterus remains small or well retracted after the placenta is expelled, there will be no bleeding, but on the other hand if it remains large and flabby, bleeding will be almost sure to come on.

Mechanism in the second position, R.O.A.—The occiput points towards the right acetabulum, and the forehead towards the left sacro-iliac joint, *i.e.*, the occipito-frontal diameter of the head lies in the left oblique of the pelvis. The left parietal bone presents. The movements of the head are precisely the same as in the first, viz., flexion, descent, increase of flexion, internal rotation, extension and external rotation.. The only difference is that the head descends in the left oblique diameter, and as the occiput rotates forward, it must turn towards the left. In external rotation, the face turns to look towards the mother's left thigh, or directly downwards towards the bed.

Mechanism of occipito-posterior positions.—In the third (R.O.P.) the occipito points towards the right sacro-iliac joint, and the forehead towards the left acetabulum, the occipito-frontal diameter of the head being in the right oblique of the pelvis. The left parietal bone presents. It is just the reverse of the first.

The movements of the head are flexion and descent in the right oblique diameter of the pelvis, and when the occiput reaches the perineum it rotates forwards into the second position and then under the pubic symphysis, and extension and external rotation occur just as in a second. In rotating forwards the occiput has to pass through a much greater circumference of the pelvis than in either the first or second positions, it will therefore take a longer time.

In a number of cases the occiput does not rotate forwards, but goes backwards, and the case becomes a persistent occipito-posterior, or face to pubes one, *i.e.*, the head is born with the occiput behind and the face to the front. This seems to contradict the rule for internal rotation, but this is really not so. In these cases flexion has not been sufficient to bring the occiput in advance of the forehead, therefore the forehead has reached the

perineum first, and it has followed the rule in passing forwards, while the occiput has of necessity gone backwards into the hollow of the sacrum. The front part of the head gets fixed under the pubic symphysis, and

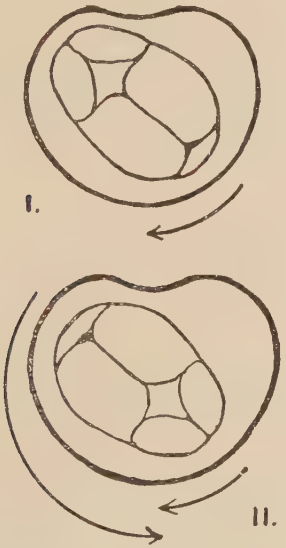

FIG. 15.—Diagram to show the difference between Occipito-Anterior and Occipito-Posterior positions as regards internal rotation:—I. Occipito-Anterior—Occiput rotates to the front through $\frac{1}{8}$ circle. II. Occipito-Posterior—Occiput rotates to front through $\frac{3}{8}$ circle, or else Forehead rotates to front through $\frac{5}{8}$ circle. (Fothergill.)

the occiput is forced over the perineum by the head becoming flexed, not extended as when the occiput is to the front. The strain upon the perineum is very great and it is apt to be torn.

In the fourth position L.O.P., the occiput points towards the left sacro-iliac joint, and the forehead towards the right acetabulum, the occipito-frontal diameter of the head being in the left oblique of the pelvis. The right parietal bone presents. It is the reverse of the second.

The mechanism is the same as with the third, except of course that the rotation is in the opposite direction. In the forward rotation it passes into a first and ends as such. As in the third, the occiput may pass backwards and the case become a persistent occipito-posterior one. The head will then be freed by **flexion** instead of **extension.**

In occipito-posterior cases, the labour is bound to be longer and more difficult, and interference will much more frequently be required than in anterior cases.

CHAPTER XIV.

The Management of a Normal Labour.

A midwife who is attending cases on her own responsibility should carry with her a bag or basket fitted up as follows :—The lining of the basket or bag should be made of canvas with straps for holding bottles. This lining can be removed from time to time to be washed and boiled. The best bottles to use are one or two ounce ones, encased in metal with spring tops.

Contents of bag—

1. Some form of douche with a glass vaginal nozzle.

2. A Higginson's syringe to be used for rectal injections only.

3. A female metal catheter. A gum elastic one is usually advised, but it cannot be satisfactorily sterilized.

4. A pair of blunt pointed scissors.

5. A clinical thermometer. A small bath thermometer is also very useful.

6. A supply of carbolic tow or absorbent cotton wool.

7. Bottles of liquid extract of ergot and sal volatile.

8. An antiseptic. Lysol is the most convenient as it does away with the need of carbolized vaseline. A bottle of perchloride of mercury tabloids should also be carried to make a solution for sterilizing the hands.

9. A clean nail brush, a piece of carbolic soap, and a clean towel.

10. Some stout linen thread for ligaturing the cord.

A monthly nurse who is attending under a doctor does not require such an outfit of her own. All that she requires is

a clinical thermometer, a female metal catheter, a pair of blunt pointed scissors, and an enema syringe. She must, however, see that her patient has ready the following articles, as well as the usual supply of baby clothing:—

1. One, or better, two Mackintosh sheets.
2. Two or more aseptic obstetric sheets or rolls of gamgee tissue.
3. Several dozen aseptic napkins. If gamgee tissue is supplied the nurse can make the napkins from it.
4. Several stout binders, and a supply of strong pins and stout linen thread.
5. Four to six ounces of lysol or creolin.
6. Several convenient sized glass, porcelain, or enamelled basins.
7. A clean nail brush.
8. A bed-pan.
9. A plentiful supply of clean towels.

When the labour is going on she must see that all the sheets, clothing, &c., are being aired before the fire, and that there is plenty of hot and cold water.

Definition of a Normal Labour.

It is very difficult to define what is meant by the term **normal labour,** but we may look upon it as one in which the vertex presents, and the child is expelled by natural efforts within twenty-four hours without anything untoward occurring.

When a nurse is summoned she should go to her patient at once. In many cases you will be sent for before you are required, but you can never be sure of this, so go at once. On your arrival enquire if the patient is having pains, when they began, how frequently they are recurring, where she feels them, if there is any discoloured discharge, and if the waters have come away.

You should also find out when the bowels were last moved, and if she is able to make water. If the patient is not in bed get her to go there so that you may examine her.

Arrangement of the room and bed.—If there is any choice in rooms an airy, well ventilated one with a fire in it, and as far removed from street noises as possible, should be selected. It should not have any more than the necessary furniture in it and as few hangings as possible. A light folding screen is most useful to keep draughts off.

The room should never have direct communications with a bathroom or W.C., nor should there be a fixed-in basin in it. A bath, W.C., or a fixed-in basin in direct communication with a confinement room are very serious scources of danger if the plumbing arrangements are not perfect. If sewer gas escapes into the room the patient will run a very serious risk of becoming septic.

The best form of bed is a firm hair mattress on a metal bedstead with a spring mattress below. All hangings should be removed, and the bed so placed that you can get round it easily. The patient should lie so that when she is on her left side her hips can be brought to the edge of the bed. The room and bed are unfortunately not, as a rule, matters of choice, so you must make the best of what you find.

The bed must be arranged so as to prevent it getting wet or soiled. A large Mackintosh sheet should be placed next the mattress, then the sheet, and over it a smaller Mackintosh with a draw sheet, which may be made of a clean sheet or blanket folded, or better of gamgee tissue or an aseptic obstetric sheet. As a rule poor people have no Mackintosh sheets, but a very good substitute can always be found in sheets of brown paper or old newspapers, using a good many plies of them.

Your patient when in bed should have her underclothing and nightdress well rolled up round her waist so as to

prevent them being soiled. Her stockings may be kept on, and many wear a flannel petticoat. If it is a clean one it may be left on, but if dirty it should be taken off.

Among the class with whom midwives have to deal, the beds and bedclothes are too often in a most insanitary condition. The patients have an idea, that because the clothing under them will be soiled during the labour, therefore it does not matter how dirty it may be to begin with. You must try to disabuse their minds of this notion, and, if you can not get clean things, do the best you can to protect the patient, by the use of sheets of paper.

External examination of the patient.—Before proceeding to make a vaginal examination, you should first make a careful external examination of the patient, by inspection and palpation. You may also listen for the foetal heart sounds, but, as a rule, nurses are not trained in the use of the stethescope, so this part of the external examination may be omitted.

Inspection.—Before the patient goes to bed, you should

Fig. 16.—Distended Bladder.

notice whether or not there is any peculiarity in her build. If there is any deformity of the back or legs, or if in a

primipara the abdomen is very pendulous, there is a probability of the pelvis being contracted. When you have thoroughly washed your hands with soap and warm water, place the patient flat upon her back, with the legs well extended, then turn the bedclothes down, and fold the nightdress up, so as to expose the abdomen, from the top of the pubic hairs to the ensiform cartilage. A careful inspection will at once reveal to you whether the abdomen is of a normal shape. If, in addition to the ordinary elongated uterine enlargement, you notice another globular swelling, just above the pubis, it may be caused by a distended bladder, or in the case of a badly contracted pelvis, by the head of the child. Get the patient to pass urine,

Fig. 17.—Palpating the Presenting Part.

and if she cannot do so, pass a catheter, and if it has been a distended bladder, the swelling will disappear. If the

abdomen is much broader than usual, suspect a transverse presentation; and, again, if it is over-distended, the case may be one of multiple pregnancy, or hydramnios. Notice also, whether or not the abdomen is pendulous, and if there is any oedema or swelling present. In a thin woman, foetal movements can often be seen.

Palpation. — With the patient in the same position, or with her legs drawn up, proceed now to palpate the abdomen. This method of examination is often omitted, but you gain a great deal of useful information

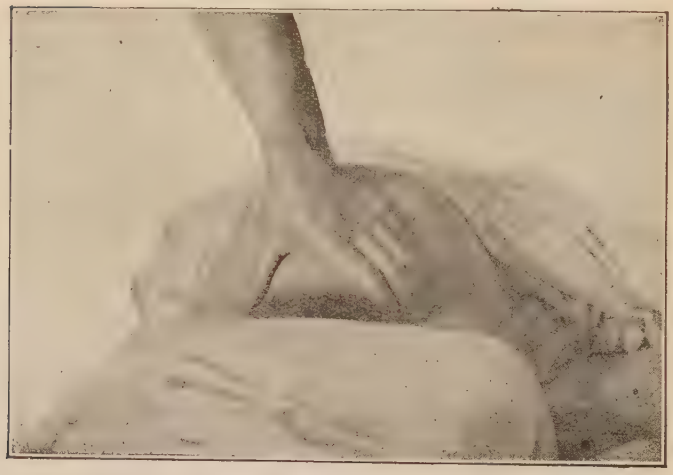

Fig. 18.—Grasping the Presenting Head with one Hand.

from it. You should therefore make it a routine practice. Before touching the patient, make sure that your hands are quite warm. If they are cold, you will not only cause the patient discomfort, but she will contract her abdominal

muscles so firmly, that you will not be able to feel the foetal parts. Stand facing the foot of the bed, and place both hands flat upon the lower part of the abdomen, one on either side, and with firm and equal pressure, sink the tips of the fingers downwards and inwards so as to grasp the presenting part of the child. In a vertex presentation, you feel a hard globular mass, the head, joined to the trunk by a narrow portion, the neck. As a rule, if the patient is a multipara, the head is felt above the brim of the pelvis, in the early stage of labour, but if she is a primi-

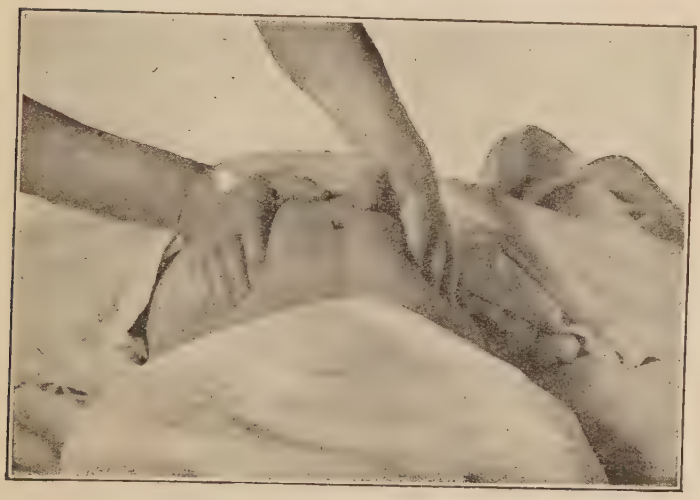

Fig. 19.—Palpating the Back and Limbs of the Child.

para, it should be engaged in the brim, and more or less fixed. If it is deeply engaged, you will only be able to feel the base of it. In either case, if it is above the brim,

it will be movable, and can be grasped with one hand. If the patient is a primipara at full time, and the head is freely movable at the brim, you should at once suspect a disproportion between the size of the head and the brim. The probability is that the case is either one of a very large head or a contracted pelvis. If your fingers sink deeply in, and you do not feel a rounded hard mass, the presentation is not a vertex one.

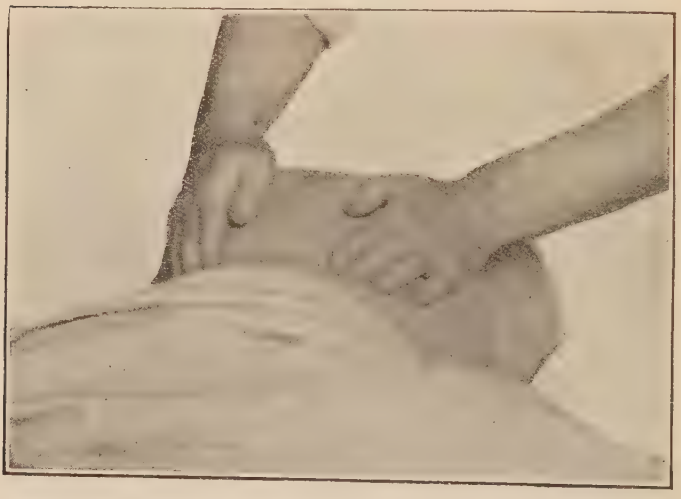

Fig. 20.—Palpating the Fundus.

Next place your hands higher up on the abdomen, and feel for the back of the child on one side, and the limbs on the other. The back is to be recognised by its smoothness, and the limbs, by their unevenness. In the great majority of cases, the back will be to the left side and well to the front, and the limbs to the right side, and more

deeply placed, indicating a left occipito anterior position of the child. If the limbs are easily felt towards the front, and the back more deeply situated, this indicates an occipito-posterior position. In the majority of occipito-posterior positions, the back is towards the right side, and the limbs are towards the left, indicating a right occipito-posterior position, which is the second in frequency. If the abdominal wall is very thick, or if there is much liquor amnii in the uterus, you will have great difficulty in making out the various parts, but in most cases, you will easily feel them. In many cases, the movements of the limbs may be felt.

To palpate the fundus, stand facing the head of the bed, and grasp the upper part of the uterus between your hands. In a vertex presentation, you should feel the breech there. It is much softer than the head and not so round, and there is no indication of a neck. If you find a hard globular mass there, it will be a head, and if you have already felt one at the brim, suspect twins, with a head and a breech presentation. In such a case, the uterus will be larger than normal, and you may be able to make out the two bodies, and more limbs than should belong to one child.

At first, you will have difficulty in recognising the different parts of the child, but after a little practice, you will be able to make out both the presentation and the position. You will also be able to form an estimate of the size of the child, the amount of liquor amnii in the uterus, and whether or not active contractions are going on.

Vaginal examination.—You will now proceed to make a vaginal examination after thoroughly sterilizing your hands and forearms and the external genitals of the patient, in the way already indicated. The patient should lie on her left side at the edge of the bed with her thighs drawn up and legs bent at the knees. For lubricating your

fingers use a warm solution of lysol. Either hand may be used for examining, but the right one is generally used. With the left hand separate the parts so that you can pass the fore or fore and middle fingers of your right hand into the vagina without touching any of the external parts.

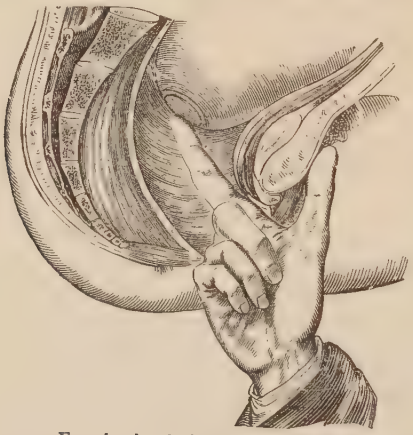

Fig 21.—Examination during the first stage. (Playfair.)

As your finger passes in you notice the condition of the vagina, whether it is lax, cool, and moist, or tense, hot, and dry. You then feel for the cervix and os, and learn whether the os is opening up, and whether the lips of the cervix are thin and tense, or thick and soft. You will next feel if the bag of membranes is protruding, and notice its shape, and whether or not it becomes tense with the pains. Next make out the presenting part. In the case we are considering it will be the head. Feel for the sutures and fontanelles, and note how the posterior fontanelle points. In the vast majority of cases it will be towards the left acetabulum. The first part of the examination should be made when there is no pain on, but it should be continued during a pain, so that you may be able to judge if the pains are true or false. If they are true pains the bag of

membranes will become tense and the presenting part be pushed down. Be careful not to rupture the membranes unless the os is fully dilated.

From the vaginal examination you learn that the woman is pregnant, that she is in labour, how far the os is dilated, the presentation and position of the child, how far on the labour is, and the condition of the passages. After some experience you will be able to judge fairly well whether the labour is likely to be easy and quick or difficult and prolonged.

If you find everything right tell the patient so, but if there is anything wrong do not inform her for fear of alarming her, but let some responsible person know and send at once for assistance if it is required. If you find the labour is far advanced and likely to be over quickly, you may tell the patient that she won't likely be very long, but be careful not to state any definite time, because if she is longer she will lose faith in you.

If you find the bowels are loaded give a soap and water enema, and if the bladder is over-distended and she cannot pass urine, draw it off by passing a catheter as directed in chapter IX.

During the first stage the patient may be allowed to move about the room. The pains are usually stronger when she is up, and the weight of the uterine contents help dilatation. Tell her not to bear down, as it will only weary her, and do no good during the first stage.

If the labour is likely to be over in a few hours, get everything ready. Have the baby's clothing, a change of night-dress for the mother, draw sheets, binders, napkins, etc., well aired before the fire.

From time to time the patient should be given some light nourishment, such as a cup of tea, beef-tea, or soup, but do not give her stimulants. Keep her cheerful and do not allow any discussing of bad cases before her. This is

unfortunately a failing among the poor, who seem to consider the lying-in room as the most appropriate place for the discussion of the details of the deaths in childbed which have occurred in the district. You must prevent this.

As soon as the membranes have ruptured put your patient to bed if she is up, and examine her, because the cord may be swept down by the rush of liquor amnii. Before examining, your hands must be sterilized, and the external genitals thoroughly swabbed. Throughout the labour, make as few vaginal examinations as possible.

Management of the second stage.—The second stage has now commenced when the os is fully dilated and the membranes ruptured. The patient must keep her bed, and you should encourage her to bear down as much as possible. To enable her to do so with the greater effect you may fasten a towel to the top of the bedstead for her to cling to, and place a stool at the bottom of the bed for her feet to press against. The suffering will now be increased and she will complain of great pain in her back, and often agonising cramp in the legs. Firm pressure over the sacrum will ease the pain in the back, and to ease the cramp in the legs rub the parts smartly. As the head begins to distend the perineum, a pillow should be placed between the knees to separate the thighs or somebody should support the right thigh. The descending head will probably press some fæces from the rectum. These and any vaginal discharge should be carefully wiped away with a pledget of wool or tow soaked in lysol. The pledget should be passed from before backwards, to wipe away from, and not towards, the vulva, so that the fæces are prevented from soiling the vulva. The same pledget should never be used twice. If the perineum is very rigid, hot fomentations to it will help to relax it.

How to support the perineum. — In many labours, especially first ones, the perineum is torn. In every first labour the fourchette is torn, but this is of no consequence unless the tear extends back into the body of the perineum.

Fig. 22.—Supporting the Perineum, Flexing and Retarding the Advance of the Head.

When the perineum is tense it is a mistake to hurry delivery of the head. You should rather retard it by telling the patient to open her mouth and cry out when a pain is on, instead of holding her breath and bearing down. This allows the parts to dilate fully. You should also try to keep the head as much flexed as possible, to bring a small diameter through. To do this, place a pledget of tow or wool over the anus, which will now be distended, so as to keep your hand from being soiled, and then apply your right hand flat over this with the thumb to one side of the vulva, and the fingers to the other, and push the whole structure forwards. Pass your left hand between the thighs, from the front, and place your finger-

tips against the part of the head just in front of the edge of the perineum. Press firmly against the head, to increase the flexion. As soon as the occiput begins to come free from under the symphysis place your thumb upon it, and grasp the head and flex it. As the head is just about to pass, prevent the patient from bearing down and, if possible, deliver it in the interval between two pains. Never strip the perineum back over the head or you will be sure to tear it.

Fig. 23.—Further Stage of Supporting the Perineum.

As soon as the head is born, slip your fingers over the occiput and feel if the cord is round the neck. If it is, pull a loop of it down and draw it over the head, or allow the shoulders to come through it. If it is several times round or is too short to allow of this, cut it and deliver the body quickly, so as to get the end next the child to tie. You may be able to tie in two places and cut between the ligatures, but this is not easy if the cord is tightly round the neck.

When the child's head is expelled it should be received in the palm of the right hand. The left hand should be applied over the fundus of the uterus, which should be followed down as the body is expelled. The birth of the body should not be hurried unless there is some reason for doing so. The next pain will usually expel it. Try to prevent the posterior shoulder from tearing the perineum by pressing well forwards.

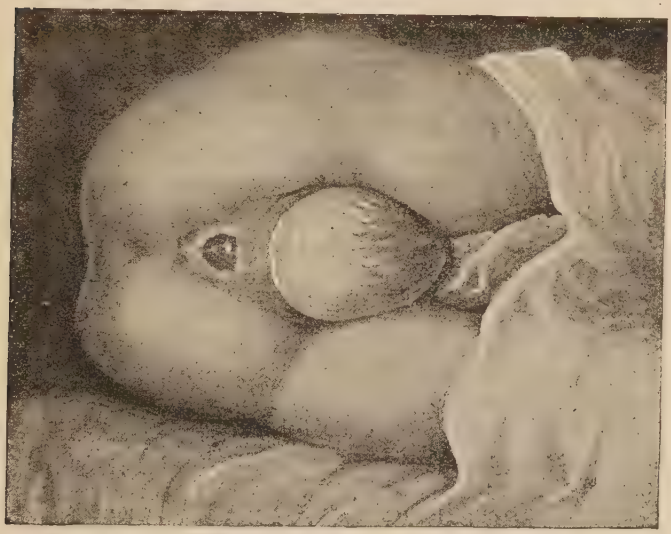

Fig. 24.—Escape of the head. Drawn from photo. by Dr A. K. Melville. (Fothergill.)

Get somebody to keep a grasp of the fundus of the uterus through the abdominal wall. The patient can often do this herself. You must wipe the child's eyes at once, and free its mouth from all mucus. It will usually gasp and cry at once, but if not lift it up by the feet and give it one or two smart slaps on the buttocks. If this does not do, artificial respiration will be necessary (see chapter XV.)

As soon as it has cried freely you may tie the cord in two places, two and four inches from the abdomen, and cut between them. If you choose you may wait until pulsation ceases before tying it. Cut the cord in the palm of your hand, and be careful not to wound any part of the child. Use a linen thread ligature, and be sure it is tied tightly enough to prevent bleeding. The objection to the ordinary tape ligature is that if it be broad it cannot be tied tight enough. Always examine the cut end to see it there is any oozing, and if there is put another ligature on. Why are two ligatures put on the cord? The one next the child's abdomen is to prevent it bleeding to death. The other ligature is not applied to prevent the mother losing blood, as none of the mother's blood ever passes through the cord. It prevents the fœtal blood, which is still in the placenta, from escaping and soiling the bed, and in the case of twins, where there is only one placenta, if it were not applied the second twin would very quickly bleed to death through the cord of the first.

When you have made sure there is no bleeding from the cord, wrap the baby in a soft warm wrap, and give it to somebody to nurse, or place it in a safe place out of the way.

How to manage the third stage.—The patient should lie on her back with her knees drawn up. Grasp the uterus with your left hand and keep gently kneading it. You will feel it harden with each contraction and then relax, and in about ten or fifteen minutes you will feel the placenta slip into the vagina. You may then get the woman to expel it by bearing down, or you can express it by pressing firmly on the uterus downwards and backwards. If you cannot expel it in this way, sterilize your right hand and hook a finger into the lower edge of it and withdraw it. The membranes are usually removed by twisting the placenta round and round, but we prefer removing them by grasping them between the fingers and

thumb and drawing gently on them. With a little practice you soon get to know by the feel whether they are peeling off complete, or tearing and leaving part behind. Examine the placenta and membranes at once to see if everything is away. The placenta should be expelled within twenty minutes after the child. If it has not come away by that time, grasp the uterus firmly and squeeze it downwards and backwards. This is known as Crédés' method, or the Dublin method. If this is of no avail after half-an-hour or so, you must send for assistance, as the placenta must be adherent and will require to be removed by passing the hand into the uterus to peel it off. A nurse should never attempt this unless she is in a place where no medical assistance can be obtained. Under no consideration should you ever attempt to draw the placenta out by pulling on the cord. You will likely pull the cord away, or you may turn the uterus inside out and perhaps cause the death of your patient.

After the placenta is away always examine the perineum to see if it is torn. You may do this as soon as the child is born; time will thus be saved if it is torn, as you must send for assistance at once to have it stitched. A slight tear does not require stitching, but if it is torn more than half way back it should always be stitched. It is quite easy to conceal the fact of a tear at the time, but if it is a bad one, back to the anus, the patient will be made painfully aware of its existence when she rises, as she will not be able to retain her fæces, and she will then rightly blame you for neglect.

As soon as the placenta and membranes are away, and the uterus is firm, remove all the soiled things from under the patient, and cleanse her thoroughly with a warm antiseptic lotion, and apply a perfectly clean or aseptic diaper. Wood wool diapers or pieces of gamgee tissue are the best, but among the poor you cannot get these.

Whatever you use make sure that it is perfectly clean. The first diaper or two had better be wrung out of an antiseptic solution. Put a warm clean draw sheet under the patient. Among the poor it will need to be a piece of old sheet or blanket, but it must be clean. Among those who can afford it, it should be an obstetric sheet or a piece of gamgee tissue. Keep gently kneading the uterus for about ten minutes, and if it remains firm and small like a cricket ball, *i.e.*, well retracted, you may apply the binder, but if it is large and flabby you must wait and keep kneading it until it becomes firm. If the discharge is excessive the binder should not be applied. It is of no use to check bleeding, but it is useful to support the relaxed abdominal wall.

The binder should be made of firm calico or cotton, about 18 inches wide, and long enough to go comfortably round the patient. Bolster slips are frequently used. Shaped binders tied with tape are sometimes used, but as a rule it is pinned on. The lower part should be low enough to grasp below the heads of the thigh bones, otherwise it will slip. Pin it firmly round the pelvis, and leave the top of it slightly slacker. If the abdominal wall is very lax, a pad may be put over the uterus, but as a rule it slips out of place and does more harm than good. The night dress should be changed if soiled, and the patient made comfortable. Her pulse should be slow and steady, somewhere about normal. If it is quick, about 120, you must be on your guard for bleeding coming on.

Ergot is often given as a routine, but this is quite unnecessary unless you find the uterus is not firm, and the discharge is too free. A teaspoonful of the liquid extract is the usual dose, but two may be given. It should never be given until the placenta is away. The most active preparation of ergot given by the mouth

is the infusion which is made by pouring hot water over a teaspoonful of dry ergot. This is commonly known as "labour tea," and was formerly much used by midwives. Ergot should never under any consideration be given before the child is born, as the result may be most disastrous to both mother and child.

Many patients are seized with a rigor or shivering fit shortly after delivery. This is really not a true rigor. It is due to nervous reaction after the severe strain of labour. It soon passes off and leaves no ill effect. A little spirits and water, or a drink of warm tea should be given, and the clothes tucked in well about the patient, and a warm bottle put to her feet if she complains of feeling cold.

When your patient is made comfortable, you must turn your attention to the infant. It should be thoroughly washed with soap and water, at a temperature of about 100° F, after it has been rubbed all over with oil to remove the **vernix caseosa.** It must be carefully dried with a soft warm towel, special care being paid to all folds of the skin which should be carefully powdered. The eyes must have special attention. In hospital cases, the eyes are always carefully washed with an antiseptic lotion, such as 1 to 4000 corrosive sublimate, or a silver solution is put into them at once. A silver solution and corrosive sublimate should never be used together, as there will be a white deposit formed on the eye. In private work an antiseptic lotion is not as a rule used, but if there is the least suspicion of a vaginal discharge from the mother, it should certainly be applied at once. They should always be carefully washed with sterilized water. We shall deal with the treatment of ophthalmia or inflammation of the eyes in a future chapter.

How to dress the cord.—When the child is thoroughly dried, examine the stump of the cord to see if there is

any oozing. If the cord is very thick, or if there is oozing, put a second ligature on it to make absolutely sure there will be no bleeding. The usual way to dress it is to draw it through a hole cut or burnt in a clean linen rag, and then fold the rag round it. The proper way to treat it would be to put an antiseptic dressing on, after dusting it with an antiseptic powder. In hot climates this should always be done, otherwise the child may die of tetanus or lockjaw. After the cord is dressed, a flannel binder is put round the child, and its end should be sewed, not pinned. The remainder of the clothes are then put on.

The child may be put to the breast as soon as it is dressed if the mother feels strong enough, but in most cases she should be allowed to rest for a few hours. If it is peevish you may give it a few teaspoonfuls of sugar and water, with a little milk. It should not be immediately dosed with castor oil.

A midwife should wait for at least an hour with her patient, and before leaving should give her some nourishment such as a cup of tea. In ordinary cases alcohol is not required, but if she is much exhausted a small dose of it may do her good. Change the napkin before you go, make sure that the uterus is firm, the discharge not too profuse, and the pulse at least below 100. If it has increased in rate do not leave her for fear of hæmorrhage coming on. Before you go, see that all soiled things are removed from the room, and leave orders that under no consideration are any soiled things to be left under the patient or stowed under the bed, a common receptacle for such.

The duties of a monthly nurse differ somewhat from those of a midwife. At the first indication of the ontset of labour, she should if possible, give her patient a hot bath, and get the bowels thoroughly cleared, if they require

it, by a dose of castor oil or an enema. The bed of course should be prepared, and everything ready to hand.

When should she send for the doctor? and before doing so, should she make a vaginal examination?

The aim of aseptic midwifery is to conduct labour with as few vaginal examinations as possible. A nurse should therefore always inquire from the doctor she is to work under, whether or not he wishes her to make a vaginal examination before sending for him. If he does not, she must send for him as soon as labour is fairly started. If she is allowed to examine, she must do so with the precautions already enumerated. If everything is normal, she need not send for him until the first stage is well on. In any case, if labour begins early in the day, she should at once acquaint the doctor with the fact, so that he may regulate his visiting to best advantage. If the labour is prolonged the doctor may not stay all the time in the patient's house, but the nurse should know where he is to be found, and she must be on the alert to recognise any unfavourable indication, and send for him at once.

CHAPTER XV.

THE NORMAL PUERPERIUM.

Care of Mother and Child.

By the term **puerperium** we mean the time from the completion of labour until the organs of reproduction have returned to their natural or normal state. This occupies from six to eight weeks. The woman should not be confined to bed all this time, but she must take special care of herself and avoid over exertion.

On the completion of labour, the uterus is about 7 inches long, and weighs about 2 lbs. It has to diminish to 3 inches in length and to a little over an ounce in weight. There is thus a large amount of material to be absorbed and got rid of. This process of absorption is known as **involution** of the uterus. During the first ten days the involution is very rapid, and can be accurately gauged each day by measuring the height of the fundus above the symphysis pubis. The usual method of measuring is by daily noting the relation of the fundus to the umbilicus, but this is anything but accurate, as the position of the umbilicus varies very much in different women. A much more accurate method is by measuring from the top of the symphysis pubis. This can easily be done by means of a tape line. To get accurate results the measurements should always be made with the bladder and bowel empty. A full bladder or rectum will raise the fundus considerably in the abdomen.

We shall give the usual method, viz., using the umbilicus as a landmark. Immediately after the completion of the third stage the fundus lies about an inch below the um-

bilicus. By the next day it will probably be slightly higher at the umbilicus, or even a little above it. Each day after that it should fall about a finger's breadth, until, by the tenth day, the top of it is level with the brim of the pelvis. It now sinks into the pelvis and the process of involution becomes much slower, but by the end of six weeks or two months it should have returned to its normal size. If the woman is suckling her child, involution will usually go on much more steadily and satisfactorily than when she is not. Sometimes the uterus remains larger than normal. This is known as a condition of **sub-involution.** On the other hand, it occasionally involutes too much and becomes smaller than normal. This is known as **super-involution.**

Lochial discharge.—For about the first three weeks of the puerperium there is a considerable discharge from the vagina—the **lochial** discharge. For the first three days or so it is fairly profuse and of a reddish colour (**lochia rubra**), and consists of blood with perhaps some clots; then for the next three or four days it is watery or serous (**lochia serosa**); and after this it becomes whitish (**lochia alba**). It gradually decreases in amount, but is continuous for about three weeks. A sudden stoppage of it indicates that there is something wrong. If the bloody discharge (**lochia rubra**), continues too long, or recurs after several days cessation, in all probability there is something retained in the uterine cavity, a piece of placenta or membrane. The discharge has a peculiar heavy odour but it should not be fœtid. As soon as it is exposed to the air it becomes septic, hence the great necessity of receiving it into aseptic or antiseptic napkins, which, when soiled, should be removed and burned. For the same reason the external genitals must be frequently cleansed with an antiseptic lotion, and no soiled draw sheets or clothing allowed to lie under the patient.

The breasts.—At the time of labour there is usually a small amount of milk in the breasts, but its active secretion does not usually occur until the second or third day. With the onset of active secretion the breasts become more or less engorged, and tender to the touch, and if this is marked there will be a slight rise of temperature and also an increase in the pulse rate.

The first milk secreted is known as **"Colostrum."** It has a purgative action on the child, and serves to clear the meconium out of the bowels.

Unless a woman is very delicate, or there is a good reason for her not doing so, she should suckle her child. There is an intimate connection of a nervous nature between the breasts and the uterus. When the breasts are stimulated by the child drawing them the uterus reacts. This is specially noticeable during the first day or two after labour. Then the uterus can be felt to contract markedly while the child is drinking. Involution, as has already been stated, goes on much more steadily and satisfactorily in women who nurse.

Care of the mother and child during the puerperium.—This is a department of obstetric work for which a nurse is specially responsible. The comfort and well-being of both mother and child depend more upon the nurse's care than upon the doctor's. If she neglects her duties the result may be very serious—nay, fatal. She must always bear in mind that she is there to carry out the doctor's orders, and that his word is law in the lying-in room.

The room must be well ventilated and kept at a temperature of from 60° to 65° F. There should always be a fire in it, in this climate at least. When the room is dusted it must be done with a duster dampened with sanitas or some other antiseptic fluid. Stirring up the dust must be strictly avoided. The patient must be kept

quiet and absolutely clean. As regards quietness a nurse will sometimes find considerable difficulty in securing this if the patient's friends are unreasonable. Only those who have the doctor's permission are to be allowed to see the patient. In trying to secure quietness the greatest difficulty will be met with among the poor. The smallness of the houses is against it, especially if there be other children, and, unfortunately, the time of a birth is usually looked upon as a most suitable occasion to entertain all and sundry who may call, regardless of the consequences to the patient. The midwife must try to prevent this as far as lies in her power.

After the mother has rested a few hours the child should be put to the breast. The nipples should first be drawn out and carefully washed.* There will not be much milk, but the child will probably get enough to satisfy it. While the breasts are being drawn the uterus will contract and expel a considerable amount of discharge and perhaps some clot. The child should be regularly put to the breast every two hours during the day, and every four or five during the night. The nipples should be carefully washed each time. If they are very short a nipple shield may be used to draw them out.

How to disperse the milk.—If it is decided that the patient is not to nurse her child, a firm binder should be fastened round her chest so as to compress the breasts. A pad of wool should be placed between them. Her diet must be kept as dry as possible, and when the bowels are moved, saline purges should be used. If the breasts become painful, belladonna may be applied in the form of extract and glycerine, liniment, or plasters. If the latter are used, an opening for the nipple must be made in the centre of each.

* During the last few weeks of pregnancy the nipples should have been drawn out, and bathed with a lotion of equal parts of Eau de Cologne and water.

Cleansing the patient and changing the diapers.—During the first three or four days this must be done every four hours, or oftener if the discharge is profuse. As the discharge lessens, fewer diapers will be required. The draw-sheets and binders must be changed whenever they are soiled. The diapers should be burned at once and the draw-sheets and binders soaked in an antiseptic solution. Before using them again they must be thoroughly washed and boiled. If they are not boiled they will be a source of danger to the patient.

When changing and doing anything about the patient, either to the breasts or vulva, the nurse must first thoroughly sterilize her hands with as much care as if she were going to make a vaginal examination. To cleanse the vulva use a warm antiseptic solution and pledgets of wool. A midwife should leave some Condy's fluid with her patient for this purpose, and instruct whoever is attending the woman how to cleanse the parts. Under no consideration should a sponge be used for this.

In the vast majority of cases vaginal douching is not necessary. It should never be done by a nurse unless she is instructed by the doctor. If it is necessary a continuous douche should be used as indicated in chapter IX.

Five or six hours after labour the patient should be encouraged to pass water. The lower part of the binder should be loosened, the diaper removed, and the external genitals thoroughly cleansed with a warm antiseptic lotion. If the patient is weak, a bedpan should be used, but if she is able she should rise on her hands and knees. The bedpan or chamber utensil should have hot water in it, to warm it, and also that the steam may rise about the patient's genitals, as this soothes the parts and makes it easier for her to pass water. It may be necessary to

apply hot fomentations to the external genitals. When she is on her hands and knees, not only will she be better able to pass urine, but the lochial discharge will get freely away, and any clots lying in the vagina will be cleared out. This free drainage will lessen the risk of sepsis. Patients who have had very severe labours and primiparous ones, especially those who have had the perineum stitched, may not be able to pass urine. If they cannot do so within ten hours after labour a catheter must be passed. This must be done with the utmost care, as indicated in chapter IX. You may have considerable difficulty in doing this, as the parts will be greatly swollen. Do it by sight and not by touch. In some cases the catheter may have to be passed for several days, but, as a rule, once is all that is required. If the bladder is allowed to become over-distended, and especially if the urine is drawn off carelessly by means of a septic catheter, cystitis or inflammation of the bladder will be set up, and the woman may suffer from this for months.

A midwife should always visit her patient within twelve hours after labour, and she should make a routine practice of enquiring whether or not her urine has been passed. If it has not, she must get the patient to do it, and if she fails the catheter must be used. She must thoroughly cleanse her patient, change her diaper, tighten or change her binder, and clear away all soiled things from under her.

The temperature and pulse should be taken night and morning, or oftener if it is necessary. The temperature should remain about normal throughout the puerperium, but on the third day it may rise to about 100° F., with the engorgement of the breasts. If it rises above 100° F., especially if the pulse quickens, your suspicions should be aroused at once. Excitement or constipation may be the cause, but it may be due to the onset of sepsis, therefore

the doctor must be notified at next visit. If it be a serious rise, say 102° or 103° F., he should be notified at once, but the nurse must be careful to conceal her anxiety from the patient.

The pulse is a most valuable indicator of the condition of the patient, and should be watched carefully. It is usually stated that the rate falls considerably below normal, immediately after labour. It does so in some cases, and may fall to 60 or even lower, but this is exceptional. In the majority of cases it remains about normal. Anything between 60 and 90 may be taken as a safe range. As we have already stated, a sudden rise to about 120 immediately after labour indicates hæmorrhage. A sudden rise during the puerperium, even although the temperature may not have risen, indicates mischief, probably of an inflammatory or septic nature. On the whole, the pulse is a truer indicator of the patient's condition than the temperature.

The diet.—The dieting of the patient is very important. She will not be much inclined for food for the first two or three days, but she will probably be thirsty. During this time she should be kept chiefly on liquids, such as tea with toast or biscuits, milk, gruel, milk puddings, soups, beef tea, and porridge in the mornings if she cares for it. As soon as the bowels are moved, forty-eight hours after labour, something more substantial can be given, such as eggs, fish, chicken, rabbit, or a chop, and in a few days ordinary plain food. If she is nursing she must take a good deal of farinaceous food, such as bread, porridge, corn flour, milk puddings, and a considerable amount of milk. If she is not nursing, the diet must be kept as dry as possible to limit the milk secretion. In such a case the thirst may be quenched by giving a cream of tartar drink with a squeeze of lemon in it. Stimulants should only be given when ordered by the doctor.

Evacuation of the bowels.—The bowels are generally confined, and must be cleared out forty-eight hours after labour. A dose of castor oil, a tablespoonful, is the best of all. If she is not to nurse, a saline purge should be given, such as a Seidlitz powder, Epsom salts, or some mineral water. It may be necessary to give a simple enema of soap and water. During the remainder of the puerperium a daily evacuation should be secured if possible. If a drug is necessary to secure this, cascara sagrada is a good one to use, but drugs should be avoided as far possible, as they affect the infant through the milk.

After pains.—Nearly every multiparous woman suffers more or less from these. In primiparæ they are rare, and when they do occur there is usually a clot, bit of placenta, or membrane, retained in the uterus. On the expulsion of the clot, bit of placenta, or membrane, they usually cease. They last from twelve to thirty-six hours after labour, and if severe will cause considerable suffering to the patient. While the child is at the breast they increase in strength. They rarely recur after the bowels have been moved.

Unless they are so severe as to prevent the patient getting rest, they do not require any special treatment. When they are very severe, a dose of opium, 15 to 20 drops of laudanum, or $\frac{1}{4}$ grain morphia suppository will usually relieve the patient and get her some sleep, but a nurse should not order these on her own responsibility.

The importance of keeping the patient quiet has already been insisted upon. During the first week the number of visitors should be strictly limited to one or two, but after that greater freedom may be allowed. The patient should be kept in her bed, but after the third day, if she is strong enough, she should be propped up in bed for a short time, perhaps during the time she is having her meals. This raising of the shoulders allows of thorough drainage from the uterus and vagina. About the seventh day, unless the patient is too weak, she should be lifted out of

bed on to a couch or easy chair, long enough to have her bed made. This should be repeated each day, and by the tenth day she may be allowed to sit up for a short time, and in a few days more she may move about the room a little. By the beginning of the third week she may move into another room while her room is being thoroughly cleaned. During this week she may move about the house a little, but she should always lie down and rest part of the day. In fine summer weather she may go out for a short drive towards the end of the third week. She must remember to take special care of herself for at least two months after labour, until the uterus has returned to its normal size. Among the working classes it is practically impossible for a woman to rest as long as she should. She is generally up doing all her household duties by the tenth day, and often before that. Hospital patients can hardly be kept in hospital after the tenth day. The result is that many of them suffer from prolapse or falling of the womb. Its supports have not had time to return to their normal condition, and the great weight of it causes it to come down.

Care of the child.—It should be washed night and morning in warm water (100° F.), and be kept perfectly clean. The stump of the cord should be dressed each day and kept as dry as possible. It drops off in from 3 to 10 days, usually about the fourth or fifth day.

The child's bowels usually move of themselves, as soon as it begins to suck. The first few motions are dark and tarry looking (meconium), and after that they get light in colour. There should be two or three motions in the twenty-four hours. If the bowels do not move within a few hours after beginning to suck it will be necessary to give some medicine, but before doing so an examination of the anus and lower bowel should be made, as in some cases the anus is imperforate, *i.e.*, the bowel does not

communicate with the outside through the anus. In such a case a dose of medicine should never be given as there can be no movement of the bowels until a surgical operation is performed. If medicine is required, a small dose, 20 or 30 drops of castor oil, is usually given, but it should not be given as a routine as the older school of nurses are so fond of doing.

Occasionally the urine is scanty and causes the child pain, or it may have difficulty in passing it. It should be given a little hot water or 10 drops of sweet spirits of nitre in water, and have its hips placed in a hot bath to ease its pain as the urine is being passed. In boys the foreskin is occasionally so tightly adherent that a probe has to be passed or circumcision performed.

The child should be put to the breast every two hours during the day and every four or five hours during the night. It will very soon get into the regular habit of expecting its food at the right times.

Sometimes the child's breasts begin to secrete milk and get engorged and tender. The milk should not be drawn or expressed from them, as this will only injure them and probably cause suppuration. A little belladonna should be applied, and gentle pressure kept on by means of cotton wool pads under the binder.

Still birth or asphyxia neonatorum.—When the child is born, and sometimes even before the body is free, it usually gasps and begins to cry, but occasionally it lies quite limp, or only makes feeble attempts at breathing. If the cord is still pulsating and the heart beating, there is a possibility of reviving it by **artificial respiration.**

When the child is bluish or livid in colour, the condition is known as **asphyxia livida;** when it is very white and limp it is known as **asphyxia pallida.** The latter is the more dangerous.

Treatment.—The mouth should be thoroughly cleared

of mucus by inserting the forefinger into it. In slight cases of asphyxia, lifting the child up by the feet and giving it a smart slap or two on the buttocks may suffice to make it gasp and cry. If this does not suffice, the cord should be tied and cut at once. In the **livida** variety, a teaspoonful or two of blood should be allowed to escape from the cord. The body of the child should then be immersed alternately in hot and cold water. The shock caused by the cold water will frequently make it gasp. Rubbing spirits into the chest is also useful. Traction upon the tongue will often do good. You may do this while the child is in the hot bath. With the head hanging well back grasp the tip of the tongue with a pair of artery forceps, draw it well forward and then allow it to recede. Repeat this manœuvre 10 or 15 times per minute. If these means do not suffice, artificial respiration must be resorted to. There are several methods adopted. The aim of all of them is to force air into the lungs and then expel it.

Direct method.—Air is blown directly into the lungs, and then expelled by compressing the chest wall The best way to do this is through a catheter passed into the windpipe, but it is not easy to pass the catheter. The air may also be blown in by direct application of your mouth to the child's. To do this, place a clean handkerchief over the child's mouth, grasp its nose between the forefinger and thumb of your left hand, while with your right hand you compress its stomach to prevent the air going into it, then blow directly into the mouth. In a few seconds expel the air by compressing the chest wall, and repeat the blowing in.

Schultze's method.—Grasp the child with your thumbs over its shoulders on the front of its chest, and the fingers spread out over its back, while the wrists support the head. Then gently swing the body round by tilting the legs up, until it, as it were, turns a somersault. The head hangs

down. At the same time you compress the chest with your thumbs. This expels all the air from the chest. You then allow it to swing back until the feet hang down These movements should be repeated from 12 to 15 times a minute, until it begins to breathe of its own accord. You must see that you have a firm grip of the child, and that your hands are not slippery, or you may easily lose hold of it, and perhaps throw it over your shoulder. Also wipe away any meconium, or it may be spattered over you.

Sylvester's method.—Place the child on its back with its shoulders slightly raised; then grasp its arms at the elbows and draw them above the head, and keep them up for a few seconds; then bring them down and press them firmly against the sides of the chest. Repeat these movements 12 or 15 times a minute.

Schultze's method is the most efficacious. Any of these methods may be used alternately with the hot and cold bath. The attempts should be kept up so long as the heart is beating. Do not readily despair; sometimes as long as an hour elapses before the breathing begins. But when the beating of the heart has entirely ceased, artificial respiration can do no good. The child is quite dead.

Care of the eyes.—We have already spoken about the care of the eyes immediately after the child's birth. In private work, except among the lowest classes, there is not, as a rule, much difficulty in preventing inflammation of the eyes or **ophthalmia neonatorum.** It used to be very common, and was formerly a very fruitful source of blindness. It is frightfully contagious, so that when a case occurs in a maternity hospital, unless the utmost care is exercised, child after child may be affected.

Cause.—The inflammation is caused by vaginal discharge getting into the eyes during the birth of the child. If this is not thoroughly washed out immediately after birth, the

conjunctiva of the lids and eyeballs becomes red and inflamed, and in a few hours begins to secrete pus in large quantities. The eyelids are swollen, and the edges of them get glued together, so that the pus is retained. When the lids are separated, it gushes out. In a short time the superficial structures of the eyeball become ulcerated. If this is not checked, destruction of the eye will quickly follow, and blindness result.

In the severe cases, the irritation is caused by the micro-organism which causes gonorrhœa (the gonococcus). In the milder form, which is commonly supposed to be due to cold, these organisms are not present.

Prognosis.—In bad cases, the danger to the eyes is very great. If great care is not exercised the disease may be conveyed to other children, or even to adults.

Treatment.—It is a disease which can be largely prevented. We have already referred to the care of the eyes immediately after birth. In mild cases, where there is practically no pus secreted, careful washing of the eyes with an antiseptic lotion—such as a solution of boracic acid, 10 grs. to the ounce, or perchloride of mercury, 1 in 10,000—will suffice. If there is pus secreted, however, much more active measures must be adopted. The eyes must be kept as clean as possible by the frequent use of an antiseptic lotion. This should be applied every few hours with pledgets of cotton wool, which should then be burnt. To check the disease, applications of a strong silver solution are the best. Solutions of silver nitrate, 5 to 10 grains to the ounce, or of protargol, 10 to 20 grains to the ounce, are used. The latter is probably the better. The pus should be cleared away, and the solution applied all over the conjunctiva. The surplus solution should be washed off either with sterilized water alone, or with a little salt added to it, as already stated. Perchloride of mercury must not be used along with a silver solution, as an

insoluble salt will be deposited on the eye. To prevent the lids from sticking together, a little vaseline or a weak iodoform ointment should be smeared on their edges.

A nurse must not use these strong solutions herself. The application will have to be made once or twice daily until the pus secretion stops. She must exercise great care in keeping the eyes clean. The pledgets of wool must be burnt at once, and any towels, etc., used for the child must be kept for it alone. When soiled, they should be steeped in an antiseptic, and boiled before being used again.

The treatment must be continued until the eyes are perfectly right, otherwise a relapse will occur.

CHAPTER XVI.

LABORIOUS OR LINGERING LABOUR.

A laborious or lingering labour differs from a normal one, in being prolonged beyond 24 hours. The risk to both mother and child is considerably increased. In labours lasting over 24 hours, the mortality is four times greater than in those under 24 hours, while in those lasting over 30 hours, it is twelve times greater. You see, then, that a laborious labour is a dangerous labour, and the danger rapidly increases with the lengthening of the time; therefore a midwife must remember to send for assistance early.

The danger to the mother arises from exhaustion, prolonged pressure upon the soft parts causing subsequent sloughing, and a liability to hæmorrhage and sepsis. In some cases the uterus may rupture.

The danger to the child is from the prolonged pressure interfering with the placental circulation.

The delay may occur in any of the stages, and may be due to faults on the part of the powers, passages, or passenger.

CAUSES OF DELAY IN THE FIRST STAGE.

I.—Faults in the Powers.

The powers we have to deal with are the uterine contractions. In the first stage, they are rarely at fault except in cases of over-distension of the uterus from hydramnios or twins, or in cases where the uterus is diseased, *i.e.* tumours. In elderly primiparæ the contractions occasionally fail, and also in multiparæ who have borne children in rapid succession. The contractions may be arrested for a time by a fright. The arrival of the doctor or nurse, especially

if he or she be a stranger to the patient, will often stop the pains for a time. These conditions will be dealt with in discussing delay in the second stage.

II.—Faults in the Passages.

The lower uterine segment and the cervix are the passages concerned in the first stage. The fault lies in the cervix alone.

1. **Rigidity of the cervix.**—This may be **simple** where there is no change in the tissues of the cervix, or **organic** where the tissues are changed by inflammation or new growth, usually cancer. The simple form is met with in elderly primiparæ. The edges of the os are regular, thin and dry to the touch. There is another simple form, known as the **spasmodic.** The edges of the os may be thick and regular, but when a pain is on, instead of dilating, the os gets smaller. The internal os is being closed by spasm of its circular fibres.

In cases of **organic** rigidity, the tissues of the cervix are hardened and thickened from tears in former labours and from inflammation. The scar tissue is hard and does not dilate easily. In other cases the hardness is due to new growths, usually cancerous. The edges feel thick, hard and irregular. In others, again, we have the cervix very much enlarged or hypertrophied. It may be so long as to project at the vulva.

Treatment.—A hot sitz bath, combined with a hot douche, is very useful. The medicinal treatment should not to be undertaken by a nurse. Chloral, chloroform, and opium, are all most useful, and if they fail, the doctor will have to dilate artificially.

2. **Occlusion or obliteration of the os uteri.**—In rare cases the os uteri may be completely closed by the lips adhering together, or it may be completely healed over. This arises from their having been inflammation of the cervix,

subsequent to impregnation. If the condition is not relieved, the uterus may rupture.

On examining vaginally, no os will be found, but a smooth surface, continuous with the vaginal walls, stretched over the head. There may be a small depression indicating where the os should be, but it is often quite smooth. The smooth surface may be mistaken for the bag of membranes, on the supposition that the os is fully dilated and retracted over the head. The fact that it is continuous with the vaginal wall all round should show that it is not the bag of membranes.

Treatment.—An operation will be necessary, therefore a nurse must send for assistance at once. A crucial incision will have to be made if the obstruction cannot be scratched through with the finger nail.

3. **Obliquity of the uterus.**—When the uterus lies too far forwards, the belly becomes pendulous, and the contractions cannot drive the fœtus in the right direction. The axis in which it is driven, instead of being downwards and backwards into the brim of the pelvis, is nearly directly backwards against the promontory of the sacrum. On inspecting the abdomen, you will find the uterus hanging down towards the thighs, and a vaginal examination will show that the presenting part is not entering the brim. The obliquity may be to one or other side, when the presenting part will be driven against the opposite side of the pelvic brim.

This condition causes delay in the first stage, but it is of more importance in the second stage, as the presenting part may not enter the brim at all.

Treatment.—Keep the patient lying on her back, and put a tight binder round her, to keep the uterus in its proper axis.

4. **Impaction of the anterior lip of the cervix.**—This is sometimes caused by the uterus lying forwards, but it is also often present without this. The anterior lip

is, as it were, pushed down before the head, and does not retract over it as it should, from being nipped between the head and the symphysis pubis. It may become very œdematous and swollen, and be easily mistaken for the prolapsed bladder, the bag of membranes, or the caput succedaneum.

Treatment.—During the pains it should be supported, and in the intervals gradually pushed up over the head.

III.—Faults in the Passenger.

1. **Hydramnios.**—An excessive amount of liquor amnii causes delay by over distending the uterus, so that the muscular fibres work at a disadvantage. The same condition is got with twins or triplets. The uterus is much

Fig. 25.—Hydramnios.

bigger than it should be, and in palpating it, the fœtal parts are not easily made out. The pains will be feeble and at long intervals. By the vagina, the head will be felt bobbing about, and not pressing into the os.

Treatment.—The membranes should be ruptured, and, if possible, some distance up, so as to preserve the fore-waters, but this is not easy to effect.

2. **Small amount of liquor amnii.**—This may be the condition of matters, although the membranes are unruptured. In such a case the uterus will be small, and the fœtal parts probably easily felt. By the vagina, the membranes will be felt stretched over the head, with no fluid between them and the scalp. You may have some difficulty in deciding that it is membrane and not scalp. The membrane should be smooth, while the scalp should be hairy.

Treatment.—Try to push up the head to allow some liquor amnii to get down in front of it to form a dilating bag, and, if you cannot do this, rupture the membranes so as to allow the head to act as a dilator.

Early escape of the waters gives you much the same condition. This may occur days before labour has set in, or you may cause it by examining too forcibly. The patient will usually be able to tell you if the waters have escaped, but you cannot always trust to this, as she may be deceived by an involuntary flow of urine. Early rupture is usually due to the membranes being thin, but it is also apt to occur in cases of contracted pelvis, and mal-presentations, with which we shall deal later. Labour in such cases is known as "dry labour." Dilatation is bound to be tedious, as the head does not act as well as the bag of membranes.

Treatment.—A nurse may assist dilatation with her fingers during the pains. If she finds the dilatation is slow, especially if the pains are strong, she should send for assistance.

3. **Adhesion of the membranes to the lower uterine segment.**—In such a case, there will be plenty of liquor amnii in the uterus, but the dilating bag of waters is prevented from passing down into the cervix. On passing the finger in through the internal os, the membranes will be found attached to the uterine wall.

Treatment.—Sweep the finger round the lower pole of

the ovum and separate the membranes as high up as you can reach.

It may be generally stated that, unless the pains are very severe and exhaustive, there is very little danger to either mother or child during the first stage of labour, so long as the membranes are intact. In all cases the forewaters should be preserved, if possible, until the os is fully dilated. Early rupture of the membranes is only advisable in cases of hydramnios, and sometimes in cases of the very opposite kind, viz., deficiency of liquor amnii.

When the membranes are ruptured, so long as there are no pains, or they are slight, there is practically no danger, but if the pains are strong, and there is not much advance being made, the risk is considerable to both mother and child. A nurse must ever bear this in mind, and send for assistance early.

CAUSES OF DELAY IN THE SECOND STAGE.

Delay in the second stage is much more dangerous to mother and child.

In dealing with the causes of delay in the second stage, whether from faults in the passages or passenger, we shall frequently have to warn the nurse against the danger of allowing this stage to be too prolonged. It is very difficult to lay down any time limit, as cases differ so much, and each one must be judged on its own merits; but, roughly speaking, one may say, that if a primipara has been four hours in the second stage, it is time delivery was effected, and for a multipara, three hours is quite long enough for safety. Of course many cases go much longer than that without anything untoward happening; while, on the other hand, others cannot be allowed nearly so long without great risk to both mother and child. In any case, if a nurse recognises some serious cause of delay, she must

not wait and trust to nature overcoming it. Nature can do a great deal, but she frequently needs to be assisted. There is one indication which may shew itself in any obstructed labour, and, on its appearance, skilled assistance is imperatively called for, *i.e.* the appearance of Bandl's or the retraction ring.

We have already spoken about the retraction or thickening of the uterine muscular fibres. The muscular fibres of the body of the uterus shew this markedly, but those of the lower part of the uterus (the lower uterine segment), from about $2\frac{1}{2}$ to $3\frac{1}{2}$ inches from the internal os, in the full time uterus, do not retract. They stretch and become thinned out until the lower part of the uterus is wide enough to allow of the passage of the child. If there is delay in the child passing, say from the pelvis being small, from a transverse presentation, or from any obstruction, and if the uterine contractions continue, the muscular fibres in the body get more and more retracted or thickened, while those in the lower uterine segment get thinner and more stretched. At the junction of the thin and thick part, a distinct ring can be felt, extending right round the uterus. By placing the hand on the abdomen, between the symphysis pubis and umbilicus, it can easily be felt. It gradually rises higher and higher until it may come to be near the umbilicus. The lower uterine segment can only stretch to a certain point, and if the process goes any further, rupture of the uterus must inevitably happen (see Fig. 26).

In an ordinary labour, Bandl's ring cannot be felt. If it ever becomes evident, it is an indication that the patient is running a very great risk of the most terrible accident, viz., rupture of the uterus, and therefore prompt means must be taken to relieve her at once. In a delayed second stage, a nurse must ever be on the watch for the appearance of Bandl's ring.

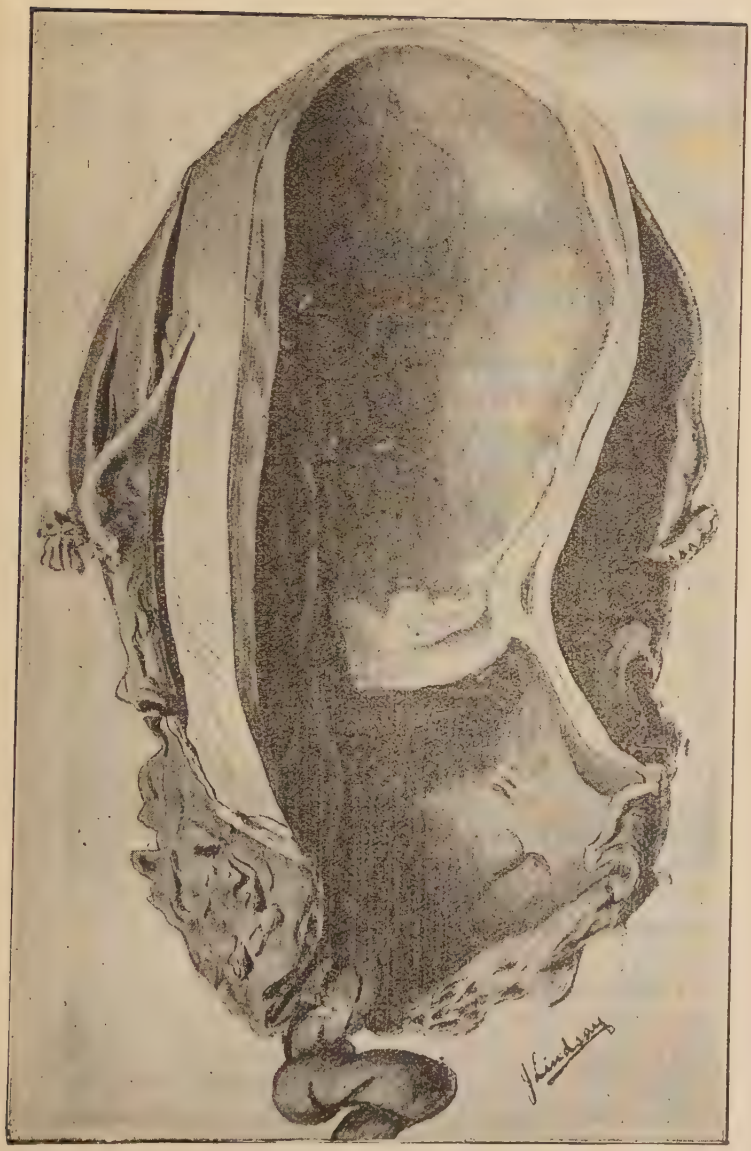

FIG. 26.—Partial rupture of the uterus. Bandl's ring distinctly seen as a ledge round the interior. The rupture is below the ring.

I.—Faults in the Powers.

In the second stage we have to deal with both primary powers (uterine contractions) and secondary powers (contractions of the abdominal muscles). Either or both of these may be at fault.

1. **Shock or fright** may, as in the first stage, stop the contractions a little, but it will only be for a short time. On the other hand, a sudden shock or fright may have the very opposite effect, and cause an increase in the contractions.

2. **Inertia uteri or failure in the uterine contractions.**—The muscular fibres of the uterus, like the fibres of any other muscle, can only do a certain amount of work or contraction before becoming exhausted. If the muscle is in good condition, it will be able to do much more work than when it is worn out by former work or disease. The same applies to the uterine muscle.

Inertia is apt to come on in cases of disease of the uterus; in cases of over-distention, where the muscle fibres have been too much stretched; in cases of constitutional weakness of the patient, as the uterus will be weakened with other parts of the body; and in cases of frequent and rapid child-bearing, as the uterus will have lost its normal tone from not having had sufficient rest between the pregnancies. This is probably one of the most frequent causes of inertia. It is thus more frequent in multiparæ than in primiparæ, but it is fairly common in elderly primiparæ. It is also apt to occur after a prolonged first stage, as the greater part of the energy has already been used up.

Treatment.—The nurse should massage or knead the uterus through the abdominal wall to stimulate contractions, and then press firmly downwards and backwards with each contraction. The application of hot fomentations to the abdomen may stimulate the uterus. Sometimes a change

of posture, as rising on the hands and knees, will assist. This is a favourite position amongst the lower class of Irish women. If these means fail, artificial delivery will be necessary, so assistance must be sent for.

Under no consideration should a nurse give ergot or other drugs to stimulate the uterus. Ergot may cause most powerful and continuous contractions, so that if the fœtus is not expelled speedily, the uterus may rupture. The effect on the child may be disastrous, even if it is expelled naturally, as the pressure may cause its death by interfering with the placental circulation. The risk to mother and child is so great that a nurse should never give it.

3. **Irregular or spasmodic uterine contractions.**—The whole uterus does not contract. The pain is very severe. It may be caused by exhaustion, disease of the uterine wall, over-distension of the bladder or rectum, or by the irritation of too frequent examinations. In a properly conducted labour, these latter causes should not arise.

Treatment.—If the bladder or rectum are distended, they should be relieved by passage of the catheter or an injection, and if this does not relieve the condition, or if it arises from some other cause, the nurse must send for assistance.

Faults in the secondary powers.—The secondary powers are pretty much under control of the patient, and the fault may lie in her not holding her breath and bearing down as she should, but, on the other hand, she may not be able to do so from paralysis, from over-distension of the abdomen by ascites or a tumour, from over-distension of the rectum or bladder, or from disease of the abdominal muscles themselves. In heart diseases, and disease of the lungs, she should not be allowed to bear down, as the strain upon the heart and lungs may cause serious mischief. If the legs have been amputated, she will not be able to bear down, as she cannot fix the pelvis.

Treatment.—If there is nothing to prevent the woman from bearing down, encourage her to do so, but if she cannot or will not, send for assistance promptly, as artificial delivery will be necessary.

II.—Faults in the Passages.

The **passages** we have to deal with are the vagina and pelvic cavity.

1. Narrowness and rigidity of the vagina is common in muscular women, and primiparæ, especially elderly ones. In some cases there are contractions in it, due to scars or cicatrices of old injuries. The unruptured hymen may be present and cause an obstruction. Again, we may have the passage obstructed by tumours, such as a fibroid attached to the cervix, or hanging down into the vagina, or it may be attached to the vaginal wall. Other tumours, such as a cancer, cyst, abscess, or collection of blood (hæmatoma), may be in the wall, or attached to the vulva. Rigidity of the perineum is commonest among primiparæ, especially among elderly ones. It may be present in a multipara if the perineum has been torn and stitched in a former labour.

Treatment.—A nurse may deal with simple rigidity of the vagina and perineum by giving a hot douche and applying hot fomentations, but with any of the other conditions she must send for assistance at once.

2. **Obstructions from the rectum.**—A mass of fæces, or a tumour in the rectum, will obstruct by pressing on the vagina.

Treatment.—If it is due to fæces, clear them out by large injections, or scoop them out with the fingers. If it is a tumour, get assistance at once.

3. **Obstruction from the bladder.**—A distended bladder

not only interferes with the powers, but also obstructs the passages. It can be seen and felt above the pubes. Sometimes the bladder is partially down before the head, forming a cystocele. The anterior vaginal wall protrudes, and may be mistaken for an impacted cervix, bag of membranes, caput succedaneum, or a tumour. The diagnosis can be confirmed by passing a catheter. (See Fig. 16.)

Treatment.—When the bladder is distended, pass a catheter and empty it—a long catheter should be used. In rare cases it may be impossible to get the instrument in. The bladder will then have to be tapped above the pubes.

When the bladder is prolapsed, it should first be emptied by catheter, and then be pushed up above the head.

A stone or tumour in the bladder may obstruct labour, but these are exceedingly rare. A nurse could not deal with them, as they would probably require an operation to remove them.

4. **Obstruction from tumours of the pelvic organs.**—Tumours of the ovaries, broad ligaments, or of the uterus itself, if large, will interfere with the powers, and may prevent the presenting part from entering the brim. If they are small, they may be pushed down into the pelvis and block the way. They are a source of considerable danger. The uterus may be ruptured, or the parts about may be so bruised as to slough during the puerperium.

Treatment.—If the tumour is small, the nurse may put the patient in the knee-elbow position, and try to push it up above the head, but she should never delay sending for assistance. If an operation is necessary, the sooner it is done the better chance for the woman.

5. **Obstruction from tumours of the bony pelvis.**—Tumours of the bony pelvis are not very common, but when they do occur, they cause a very dangerous obstruction. A very hard immovable mass will be felt attached

to some part of the pelvis. There must be no delay in sending for assistance.

The most frequent obstruction in the bony pelvis is caused by deformity or contraction of the pelvis. We shall devote a separate chapter to this.

6. **Obstruction from anchylosis of the sacro-coccygeal joint.**—This condition is occasionally found among elderly primiparæ who have led a sedentary life. As the joint is fixed the coccyx cannot swing back, so the conjugate diameter at the outlet is shortened. Delivery with forceps will probably be necessary. There is risk of the coccyx being broken off.

CHAPTER XVII.

DEFORMED OR CONTRACTED PELVES.

A **pelvis** may be contracted in one or more of its diameters, either at the brim or outlet, or at both. The contraction at the brim is the most important, especially in the antero-posterior or true conjugate diameter. If this diameter is contracted below $2\frac{3}{4}$ inches, delivery of a living full-time child by the natural passages is practically impossible.

Methods of diagnosing a contracted pelvis.—Many of the women shew more or less deformity of the legs or spine. In most cases the abdomen will be markedly prominent or pendulous. If a primipara is observed to have a pendulous abdomen, contraction of the pelvis should at once be suspected. The external measurements, which are taken by means of calipers, will be found abnormal, not necessarily shortened (because in some instances, as in flat pelves, the transverse diameters, *i.e.* between the iliac crests and iliac spines, will perhaps be increased), but the difference of one inch between the two will not be present. The diagonal conjugate, *i.e.* the distance from the lower edge of the symphysis to the centre of the promontory is the important one to measure. From it you can judge the length of the true conjugate at the brim. Instruments are used for measuring this, but no instrument superior to the fingers has yet been devised. The measurement can be taken with the patient either on her back or left side. The fore and middle fingers of the right hand are passed into the vagina, and

pressed up until the tip of the middle finger touches the centre of the promontory. The position of the lower edge of the symphysis pubis is then marked on the edge of the hand with the nail of the left forefinger. The distance from this point to the tip of the middle finger gives the length of the diagonal conjugate. In an ordinary pelvis half-an-inch has to be subtracted, but in a deformed one, it should be three-quarters, as the symphysis is deeper and thicker.

Fig. 27.—Measuring the diagonal conjugate. (Fothergill.)

In a **normal pelvis** it is difficult to reach the promontory unless your fingers are exceptionally long; therefore, in every case in which you reach it with anything like ease, some contraction is likely to exist. On the other hand, if you cannot reach it, you may feel pretty confident the conjugate is not contracted.

Any abnormality in the shape of the brim can be recognised after you have had some experience in examining normal pelves. The fingers should be swept round to find if there are any such.

If the outlet is contracted, the tip of the coccyx will be felt projecting forwards, and the arch of the pubes narrowed.

Method of increasing the length of the true conjugate during delivery.—By placing the patient in what is known as the **Walcher position,** it is possible to enlarge the true conjugate about $\frac{1}{3}$ of an inch. The patient must lie on her back with her hips at the edge of the bed or table and her legs hanging down. The feet must not touch the floor or be supported in any way. The weight of the legs drags on the front of the pelvis, principally through a strong ligament which extends from the top of the thigh bone over the hip joint to the front of the innominate bone. The innominate bones are thus dragged down from the sacrum, rotation taking place round the sacro-iliac joints. The symphysis pubis is drawn down and away from the promontory, and the true conjugate is lengthened about $\frac{1}{3}$ of an inch. The conjugate at the outlet is slightly decreased, so that as soon as the head has passed the brim the patient should be placed in the ordinary position to complete delivery. This position should be tried in every case where there is difficulty in delivering through the brim, whether from large size of the head or contraction of the pelvis. A gain of $\frac{1}{3}$ of an inch when the pelvis is contracted is of vast importance, and will often enable you to deliver a live child, which could not be effected in the ordinary position.

We shall discuss the different forms of contractions under the divisions of the generally contracted, the flattened or antero-posteriorly contracted, the compressed, the transversely contracted, and the obliquely contracted.

The Generally Contracted.

Pelvis equibiliter justo minor.—The justo minor pelvis is contracted, but not deformed. It is merely a small pelvis of normal shape. It is equally contracted in all its diameters. In some the contraction is very slight and has

FIG. 28.—Walcher's Position. (Fothergill.)

very little effect on labour, while in others it may be sufficient to render labour very difficult.

The patient may be a small woman, but not necessarily so, as many small women have perfectly normal pelves. The promontory will be reached with ease, and the diagonal conjugate found under $4\frac{1}{2}$ inches.

Labour in a justo minor pelvis is more difficult than in a normal one. To allow the head to pass, flexion must be very marked. This is the only peculiarity in the mechanism. Artificial delivery will likely be necessary. These are typical cases for forceps.

The Antero-Posterior Contraction.

Flat pelvis.—In this condition the pelvis is flattened from before backwards, *i.e.* the promontory is pushed forwards and the pubes backwards. The conjugate diameter at the brim is decreased, while the transverse one is increased. The brim is kidney-shaped. The iliac bones are flattened

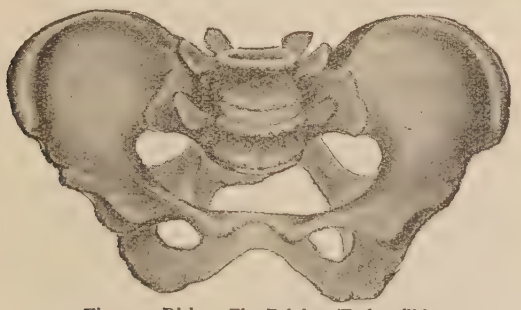

Fig. 29.—Rickety Flat Pelvis. (Fothergill.)

out so that the inter-spinous diameter instead of being an inch shorter than the inter-cristal will be about equal, or may even be greater. The sacrum is flatter than in an ordinary pelvis, and the pubic arch is wider. The outlet is therefore increased in size. The contraction

lies at the brim in the antero-posterior diameter, and it is there difficulty arises. If the head has once passed the brim there will be no difficulty at the outlet.

This deformity of the pelvis is in most cases the result of rickets in infancy, but a non-rachitic flattened pelvis, which has been developed in that shape, is occasionally met with. Rickets is unfortunately very common among the children of the poorer classes in Glasgow, so that we meet with this form of pelvis quite frequently in the Maternity Hospital here. Ten cases out of every one hundred delivered in the hospital shew it more or less.

Rickets is a disease of infancy which causes softening of the bones. It is caused by improper feeding. While the bones are in this soft condition, pressure or weight causes them to bend. The legs and arms shew this markedly. The ends of the bones become much thickened, causing the condition which is commonly known as "double-jointed." When recovery takes place, the bones harden again, and the deformity is fixed. An adult who has had rickets in infancy is usually stunted in figure, with a square prominent forehead, enlarged wrist, ankle, and knee-joints, and curved and thickened legs and arms. The ribs and backbone may also be affected.

Diagnosis of a flat rickety pelvis.—The patient will usually shew indications of having had rickets. The abdomen will usually be pendulous. The inter-spinous and inter-cristal diameters will be nearly equal. On making a vaginal examination the promontory will be easily reached.

Prognosis.—If the contraction be at all marked, the danger to the mother is great, and to the child exceedingly great. Indeed, it may have to be destroyed to effect delivery.

Mechanism.—If the contraction is not great, labour may be finished by natural efforts. The mechanism

differs somewhat from that in an ordinary pelvis. The head usually presents with the occipito-frontal diameter in the transverse of the pelvis. The head is not flexed, so the anterior and posterior fontanelles are on a level. The anterior parietal bone usually presents, so that the sagittal suture lies near the promontory. In rare cases the posterior parietal presents, and the sagittal suture then lies near the symphysis pubis. The biparietal diameter of the head lies in the conjugate, but this is the longest transverse diameter of the head in the shortest diameter of the pelvis. To bring the bitemporal, or shorter one, into the conjugate, the anterior part of the head dips a little, or extends slightly, and the head slips towards its occipital end. The posterior part of the head then rounds, or is driven down past the promontory. When the head has once passed the brim, there will be no more difficulty. The mechanism then becomes the same as in an ordinary case. In these cases the coccyx does not curve forwards, and the perineum is apt to be torn by the head being driven down straight.

The head often shews a groove where the promontory has pressed against it.

In contracted pelves, abnormal presentations are very common, and as there is likely to be difficulty, a nurse should never undertake such a case alone, even if the head should present.

Spondylolisthetic pelvis.—In this condition the last lumbar vertebra has partly slipped down in front of the promontory, and thus blocks

Fig. 30.—Spondylolisthetic Pelvis. (Fothergill.)

the brim partially. This may be the result of accident or disease. The outlet is also lessened by the lower end of the sacrum being tilted forwards. The false promontory can be very easily reached.

Lordosis.—Lordosis or anterior curvature of the spine causes contraction of the conjugate at the brim by bending forwards the promontory. This will cause marked prominence of the abdomen.

Compressed Pelvis.

Malacosteon or Osteo-malacic pelvis.—This deformity is the result of a disease known as **mollities ossium,** which causes softening of the bones in a grown-up person. Rickets has the same effect in the child, but the resulting deformity is greater in mollites ossium, as the patient's body is heavier and the pressure on the softened bones greater. When the person stands or walks, the weight of the body is transmitted through the heads of the thigh

Fig. 31.—Malacosteon Pelvis. (Fothergill.)

bones, and the sides of the pelvis are pressed in. When she sits, the ischial tuberosities and lower part of the sacrum and coccyx are bent in and forwards. The pelvis thus becomes compressed or crumpled in.

The condition is rare in this country, but commoner in hot climates, as India. If the bones have become set, delivery by the natural passages will be impossible in a marked case. Occasionally the bones are still soft, and then it may be possible to expand the parts and deliver. A destructive operation on the child will usually be necessary, unless Cæsarean section is done. The proper operation to do is known as Porro's. It is the form of Cæsarean section, in which the uterus and ovaries are removed. If the patient survives, it will cure her mollites ossium.

Transverse Contraction.

Kyphotic pelvis.—In kyphosis or angular curvature of the spine, the lower lumbar and upper sacral vertebrae are drawn back, thus increasing the conjugate at the brim and narrowing the transverse. The pubic arch is usually narrowed and the outlet diminished. Difficulty in delivery will be met with at the outlet.

Robert's pelvis.—In this pelvis both sacro-iliac joints

Fig. 32.—Robert's Pelvis. (Fothergill.)

have become anchylosed from disease, and the transverse

diameter markedly decreased. Delivery of a live child through such a pelvis is practically impossible.

Funnel-shaped or male pelvis.—In this form the pelvis is of the male type. It is a deeper pelvis, somewhat narrowed transversely, especially at the outlet.

Oblique Contraction.

Scoliosis or lateral curvature of the spine will cause contraction of one or other oblique diameter at the brim. Rickets is often associated with this condition, and may cause flattening as well.

Fig. 33.—Scolio-Rachitic Pelvis. (Fothergill.)

Naegele pelvis.—In this pelvis one sacro-iliac joint has become anchylosed, and that side of the pelvis has ceased to grow. In the Robert's pelvis both joints are anchylosed, and the contraction is equal on both sides.

When once a nurse has decided that the patient has a contracted pelvis, her duty is plain, viz., to send for

skilled assistance at once, or to get the patient transferred to hospital without delay. She should be very careful not to rupture the membranes. In the vast majority of cases an operation will be necessary. In a minor degree of contraction, down to 3 inches, delivery by forceps or turning may be possible, provided the child is not

Fig. 34.—Naegele Pelvis. (Fothergill.)

very large. If the conjugate is below 3 inches, the child will either have to be broken up or delivered by Cæsarean section. Down to $2\frac{3}{4}$ inches, the operation of symphysiotomy may be done. If the conjugate be under 2 inches, Cæsarean section will be the only possible course, as the pelvis is too small for a destructive operation on the child.

CHAPTER XVIII.

LABORIOUS OR LINGERING LABOUR—*Continued.*

III. Faults on the Part of the Passenger.

1. **Toughness of the membranes.**—In some cases the membranes are so tough they do not rupture when the os is fully dilated. They may protrude at the vulva.

Treatment.—Rupture them as soon as the os is fully dilated. This may be done by scratching through them with the finger nail during a pain, or by passing the stylet of a catheter through them. The liquor amnii should be caught in a bowl so as to keep the bed dry.

2. **Large size of the fœtal head.**—The heads of male children are larger than those of female. The children of some women have abnormally large heads. In others again the head is harder than normal, the bone formation or ossification having advanced further than usual. Such a head will not mould. In cases of prolonged gestation, not only the head but the whole fœtus will be large.

Hydrocephalus, or "water in the head."—In this condition the head becomes distended by fluid. It may be so large as to completely obstruct. The bones are thin and widely separated, and the forehead bulges very much. It is very important to be able to recognise a hydrocephalic head. A vaginal examination will reveal that the head is high up and very large. The sutures will be wide, and the fontanelles much larger than usual. The bones will be felt to be thin and easily depressed. If the patient lies on her back, and the nurse passes two fingers of the right hand into the vagina and presses the left hand above the symphysis pubis, she will be able to

grasp the head between the hands, and can make out that it is very much enlarged. This is what is called examining bimanually. It is a most important method, and should always be adopted when hydrocephalus is suspected. In many cases hydrocephalic children present by the breech, and the body is easily born, but the head sticks. In such cases the body is usually small and somewhat shrivelled.

Treatment.—With an ordinary large or hard head assistance will usually be required, so a nurse must not delay sending for it beyond the usual time. When a hydrocephalic head is diagnosed, assistance should be sent for at once. Delay is very dangerous, as the uterus may rupture. In such a case the head will probably have to be perforated to allow it to collapse. This of course destroys the child, but that is of little consequence, as a hydrocephalic child is not likely to survive, even when born alive.

3. **Malformation of the fœtus.**—In some cases the fœtus has a large tumour attached to the back of its head—a **meningocele.** The membranes of the brain, filled with fluid, protrude through an opening in the skull. We sometimes find the same kind of tumour protruding from the back through an opening in the spinal column. This is known as a condition of **spina bifida.** In other cases, again, we find the chest distended with fluid—**hydrothorax**—or the belly in the same condition from **dropsy** or **ascites,** or distended with gas when the fœtus is dead. In others, again, there may be large **tumours** of the kidneys, liver, etc. **Monsters** of various kinds, such as two fœtuses united together, like the Siamese twins, or one with a portion of another attached, may cause great difficulty.

These conditions are very hard to recognise, and a nurse can hardly be expected to make a definite diagnosis. She should, however, be able to recognise that the labour is

being unduly prolonged, and that her duty is to send for assistance and not to wait.

4. **Prolapse of the arm by the side of the head.**—This occasionally occurs, and gives rise to considerable delay. The hand will be felt by the side of the head.

Treatment.—If the hand cannot be pushed up by the head, assistance should be sent for early. The nurse should not delay until the head and arm are jammed down into the pelvic cavity. The child may have to be turned, and this can only be done early.

5. **Shortness of the cord.**—The cord may be actually only six or eight inches long, or a long cord may be so wound round parts of the child as to give rise to the same condition. Besides delaying labour, it may cause inversion of the uterus, separation of the placenta before the birth of the child, or the cord itself may rupture. It is very difficult to recognise such a condition, except when the head is born, and the cord is found wound several times round the neck. If the placenta is attached to the anterior uterine wall you will notice that the wall is being dragged upon with each pain.

Treatment.—Cut the cord if it can be reached, and deliver quickly.

6. **Malpositions of the head** or occipito-posterior cases.—The mechanism and management of these cases have already been fully dealt with in chapter XIII.

Malpresentations of the Head.

7. **Face and brow presentations.**—The face presents about once in two hundred cases. The chin or mentum is the leading part or denominator, just as the occiput is when the vertex presents. We have the four positions, two anterior and two posterior, as in vertex presentations.

A face case is merely a head presentation in which extension has occurred, so as to bring the chin in advance instead of the occiput, as in an ordinary vertex presentation.

If we take a first vertex presentation, L.O.A., and cause extension to take place, we find that the chin comes to point towards the right sacro-iliac joint, and the forehead towards the left acetabulum, the long diameter of the face being in the right oblique of the pelvis, *i.e.*,

1. L.O.A. changes into R.M.P. Right mento-posterior.
2. R.O.A. „ „ L.M.P. Left „ „
3. R.O.P. „ „ L.M.A. Left mento-anterior.
4. L.O.P. „ „ R.M.A. Right „ „

The first, second, third, and fourth face positions are named according as they are converted from first, second, third, and fourth vertex. The first face or right mento-posterior is the most frequent one.

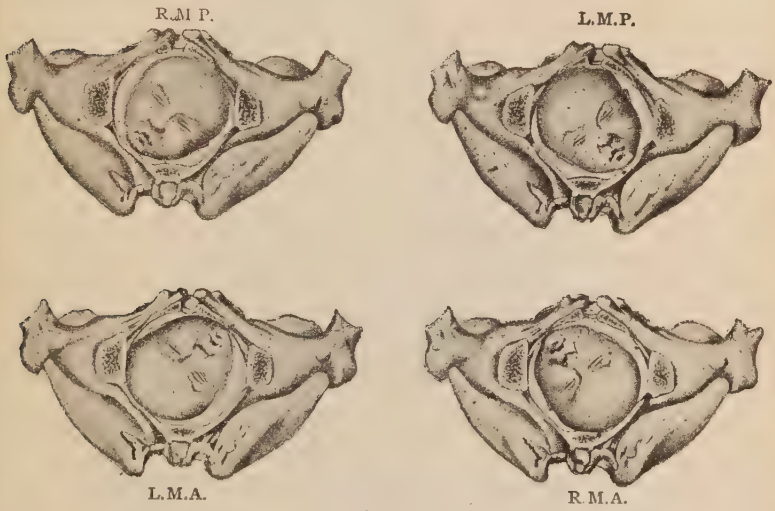

Fig. 35.—Four Positions in Face Presentations from below. (Croom.)

Face cases are divided into **primary and secondary.** In the primary the head is extended and the chin leading when labour commences. This may be due to the large size of the chest throwing the chin up, to a tumour of the

thyroid or thymus glands of the neck, causing the same condition, or to contraction of the muscles of the back of the neck drawing the head back. In the secondary, extension has not been present at first, but as soon as the head has commenced to descend, the occiput has become hitched on the brim of the pelvis and the chin has been forced down. A head with a long occiput (a dolichocephalic head) predisposes to this. It is apt to happen if the uterus is obliquely inclined towards one or other side, and also in contracted pelves, as in such cases the occiput is very apt to hitch on the brim as soon as descent begins.

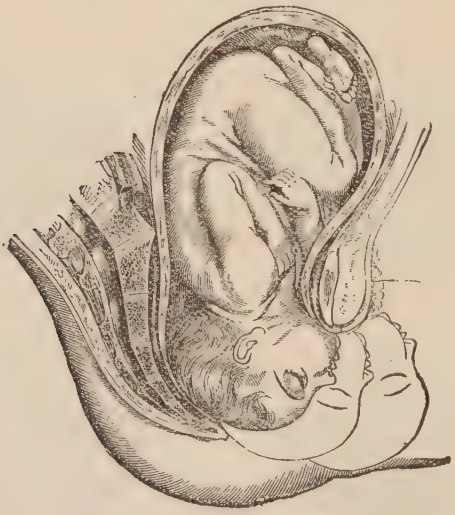

Fig. 36,—Passage of the head through the external parts in Face Presentation. (Playfair.)

Mechanism of labour in face cases.—We have the same movement as in vertex cases, only extension and flexion are reversed, while internal and external rotation remain the same. In the first face, R.M.P., the chin points towards the right sacro-iliac joint, the forehead

towards the left acetabulum, and the long diameter of the face lies in the right oblique of the pelvis.

The first movement is **extension,** which becomes greater and greater as the head descends in the right oblique of the pelvis. The chin or leading part strikes the pelvic floor first, and following the rule, **rotates** forwards until it gets under the symphysis pubis. In the mento-posterior positions this is a long rotation. The chin is caught under the symphysis, and then **flexion** occurs, and the forehead, vertex, and occiput sweep over the perineum, and the head is born. **External rotation** and birth of the shoulders and body occur, as in an ordinary vertex case.

Fig. 37.—Position of the head when forward rotation of the chin does not take place.. (Playfair.)

In mento-posterior cases the chin occasionally rotates backwards into the hollow of the sacrum, just as the occiput does in persistent occipito-posterior cases. In these cases the extension has not been sufficient to bring

the chin down in advance of the forehead, so that the forehead has reached the pelvic floor first, and has followed the rule of passing forwards, while the chin has necessarily gone back into the hollow of the sacrum.

In the mento-anterior cases the mechanism is exactly the same as in the mento-posterior, except that in anterior rotation the chin has a much shorter distance to travel.

Head moulding and caput succedaneum.—The head is very much flattened from above downwards and elongated from before backwards, *i.e.*, the occipito-frontal diameter is considerably increased. The caput succedaneum forms on the face, which will be much swollen and disfigured. The lips, nose, cheeks, and eyelids will be very œdematous, and blood may be effused into the conjunctiva, *i.e.*, under the outer layer or covering of the eyeballs.

Prognosis—The risk to the mother is slightly greater than in vertex presentations.

Diagnosis.—If the membranes are not ruptured, they may be found protruding in a sausage shape. Care must be taken not to rupture them. The presenting part will be soft and irregular. In the early stages, before extension has become great, you will be able to feel the anterior fontanelle and forehead. If extension is at all marked, the orbital ridges, eyes, nose, mouth, and chin are easily made out. Care must be taken not to injure the eyes. The face may be mistaken for the breech, the mouth being taken for the anus. If the finger is passed into it, the gums and tongue can easily be made out. In a breech presentation, after the membranes have ruptured, meconium will be got if the finger is passed into the anus.

Treatment.—On the recognition of a face case, a nurse should always send for assistance. She should be careful to preserve the membranes as long as possible, and also not to injure the eyes. The best treatment in a face

case is either to bring the occiput down and convert it into an ordinary vertex, when it may be left to nature or delivered immediately by forceps, or else to turn the child. This is for a doctor and not a nurse to do, and can only be done before or shortly after the membranes have ruptured. The labour may be allowed to go on naturally, but it is better to interfere early. Extension and internal rotation should be assisted by pushing the forehead upwards and backwards into the hollow of the sacrum, or by drawing the chin downwards and forwards. If the face becomes impacted, delivery can usually be effected by forceps, but in persistent mento-posterior cases this will likely be impossible, and the head have to be broken up. The perineum is apt to be torn.

It is well not to let the mother see the child at once. The swelling of the lips may prevent it sucking at first. In a day or two the great moulding of the head and the swelling of the face will have disappeared.

Brow presentations—This is a very rare presentation. The brow is the leading part or denominator. This presentation is practically a half-way stage between a vertex and a face one. A certain amount of extension has occurred, but not sufficient to bring the chin in advance. The brow may present in any of the four positions.

Mechanism.—The first movement is one of slight **extension,** and when the brow reaches the pelvic floor it passes forward under the pubes, and the head is thrown clear by **flexion. External rotation** and the birth of the body follows, as in an ordinary vertex case. Occasionally the head is expelled without internal rotation occurring.

Prognosis.—The risk to mother and child is slightly greater than when the face presents. The perineum is very apt to be torn.

Diagnosis.—The anterior fontanelle and brow are felt by the examining finger.

Treatment.—If seen before the brow is jammed down into the pelvis, the head should be flexed, so as to convert it into an ordinary vertex case, or the child should be turned. If it is engaged, an attempt should be made to bring the chin down, so as to convert it into a face case. Forceps will probably be required, and, if the head is jammed, it may have to be broken up. A nurse should never attempt to treat a brow case alone. The forehead and brow will be very much swollen, the caput succedaneum being over the frontal bone and anterior fontanelle.

CHAPTER XIX.

PRÆTERNATURAL LABOUR.

In this form of labour some part of the child other than the head presents. There are two main presentations. First, **The breech** or lower extremity; second, **The trunk** or upper extremity.

Breech or pelvic presentations.—The long axis of the fœtus lies in the long axis of the mother, just as in head-first labours, but the lower end comes first, *i.e.*, the breech or buttocks instead of the head.

The pelvis presents about once in thirty-three cases. We have three varieties, viz. :— 1, Breech, when the buttocks or pelvis presents; 2, Footling, when one or both feet present; 3, Knee, when one or both knees present. The mechanism is the same in the three varieties. The breech is the most frequent, and the knee the least.

Causes.—Anything which interferes with the normal shape of the uterus tends to cause the breech to present, *e.g.*, excessive liquor amnii, contracted pelvis, tumours, multiple pregnancies, placenta prævia, and obliquity of the uterus. Monsters, dead or premature children, and those suffering from hydrocephalus, frequently present by the breech.

Diagnosis.—By abdominal palpation the rounded head can be made out at the fundus. The fœtal heart will be heard loudest above the umbilicus. The membranes, if intact, will protrude in a sausage shape. They often rupture early, because the breech does not dam back the liquor amnii effectually, so that the uterine contractions

force the fluid strongly against the bag, which gets protruded through the os in an elongated form. The presenting part will be much softer than the head, not so rounded, and there will be no sutures or fontanelles felt. The sacrum, coccyx and ischial tuberosities can be felt. When the membranes are ruptured, the anus and genital organs can easily be recognised. The anus can be told from the mouth by the fact that there are no hard gums or tongue inside of it. The examining finger will be stained with meconium. The crest of the ilium can often be reached and the finger passed into the fold of the groin. This may be mistaken for the axilla or armpit, but in the latter you should be able to feel the ribs. The foot can be distinguished from the hand in that it is placed at right angles to the limb, the toes are about equal length, and the big toe cannot be separated at right angles from the others as the thumb can.

Prognosis.—The mother does not run any greater risk than in an ordinary head first labour, but the child does. One in five is said to be lost. The danger to the child arises from early rupture of the membranes and delay in the delivery of the head, which allows of pressure on the placenta or cord. The child may also make efforts to breathe while the head is in the vagina, and become suffocated from drawing mucus, etc., into its air passages. It may also be injured and even killed during artificial delivery. The legs or arms may be broken, and, what is of more consequence, the neck dislocated and the spinal cord torn. In contracted pelves the skull may be fractured or a blood vessel burst in the brain.

Positions.—We have four, as in ordinary vertex cases. The sacrum is usually taken as the denominator, but unfortunately it is not the part which leads, neither does it rotate forwards. It is the front hip of the child which does this. The positions are usually given as—first, left sacro-

anterior (L.S.A.), with the sacrum pointing towards the left acetabulum, and the bisiliac diameter, *i.e.*, the diameter between the iliac crests of the fœtus lying in the left oblique of the mother's pelvis; second, right sacro-anterior (R.S.A.), with the sacrum pointing towards the right acetabulum and the bisiliac diameter in the right oblique; third, right sacro-posterior (R.S.P.), is the reverse of the

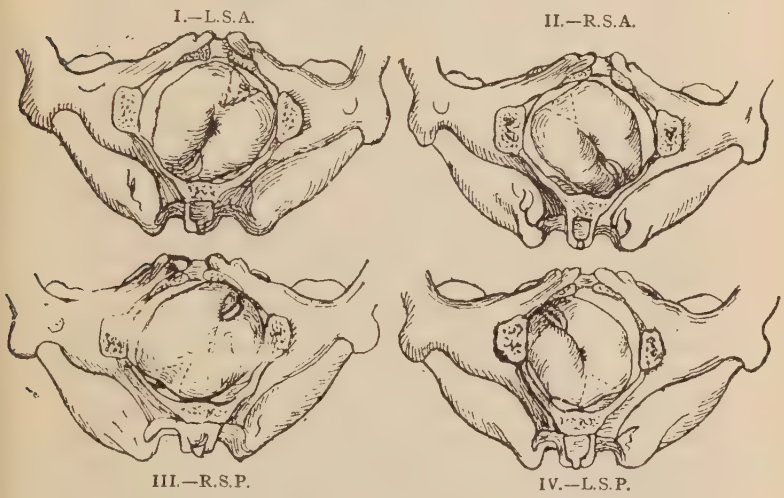

Fig. 38.—Four Positions in Breech Presentation from below.

first, *i.e.*, the sacrum points to the right sacro-iliac joint; fourth, left sacro-posterior (L.S.P.), is the reverse of the second, *i.e.*, the sacrum points towards the left sacro-iliac joint. In the first and second the back of the child points towards the front, while in the third and fourth it points towards the back of the mother. The first is by far the most frequent, and the third the next in frequency, just as in vertex cases.

Mechanism.—If the fœtus is very small, the breech may be driven straight down, but as a rule the anterior

hip passes down in advance. The first movement is one of **descent,** with the anterior hip in advance. The bisiliac diameter passes down in one or other oblique diameter. In the first and third it is in the left oblique, and in the second and fourth in the right. When the leading hip reaches the pelvic floor, it follows the rule and **rotates** forwards. In the sacro-anterior positions the sacrum rotates slightly backwards, and in the sacro-posterior slightly forwards. The anterior hip gets caught under the pubic arch, and the posterior one sweeps over the perineum by a movement which is practically **extension.** The legs and body are then expelled. The arms should be folded across the chest. The anterior shoulder passes forwards under the pubic arch, while the posterior one sweeps over the perineum. The aftercoming head enters the pelvis with its long diameter, the occipito-frontal in the transverse, and, as it comes down, the occiput rotates forwards under the pubic arch, the forehead passing into the hollow of the sacrum. This causes an **external rotation** of the body. The nape of the neck is fixed under the pubic arch, and the chin, face, and forehead sweep over the perineum by a movement of **flexion,** and the child is born. In a few rare cases the chin instead of the occiput passes forwards under the pubic arch. The chin, face, and forehead may be expelled first by flexion, or the occiput and vertex sweep over the perineum, and the head be born by a movement of extreme extension, the face of the child looking directly into the vulva as the birth is completed.

The caput succedaneum will be over the leading hip and genital organs. The scrotum of a male may be very much swollen and quite black from effused blood.

Causes of Delay in Breech Cases.

The first stage is apt to be prolonged by the membranes

rupturing early. In the second stage we get what is known as **impaction of the breech.** The breech comes down into the pelvis and is jammed there. This may happen with a large child, when the soft parts are rigid, when a tumour obstructs, when the pelvis is contracted, but a very common cause is extension of the legs so that the feet lie well up on the chest.

Upward displacement of the arms.—This is apt to happen if traction is made on the legs. It is also apt to occur in contracted pelves. The elbows hitch on the brim, and the arms are thus thrown up by the side of the head and effectually block its passage.

Impaction of the aftercoming head.—This is very apt to occur in contracted pelves, also when the head is large, and when traction is made on the legs, without at the same time applying supra-pubic pressure. If traction is made on the legs, the head is liable to become extended, and a long diameter is thus substituted for a short one, so the head is apt to be arrested. This is very serious, as a few minutes' delay may cause the child's death.

Treatment.—Keep the membranes intact as long as possible. Leave the delivery to nature until the breech is born and the body expelled as far as the umbilicus, then draw down a loop of the cord and feel if it is pulsating. If the cord is quite pulseless and flaccid, the child is dead, and there is no need of hurry; if it is pulsating quite freely, there is no immediate danger to the child; but if the pulsation is very quick and feeble, delivery must be effected very quickly if the child is to be saved. In any case delivery must not be prolonged many minutes, as the risk is considerable. The child's body should be wrapped in a warm towel to prevent it getting chilled. While the body is being expelled, supra-pubic pressure should be kept up to keep the head flexed and prevent the arms passing up by its side. If

the arms are not quickly expelled, they must be brought down. Seize the child's legs and swing the body as far out of the way as possible with one hand while the fingers of the other hand are passed along the front of the body until the nearest arm is reached. The fingers should be passed into the bend of the elbow and the forearm and hand swept down over the front of the child. Relieve the most accessible arm first, and then the other can usually be easily reached. The head may be expelled by nature, but, as a rule, assistance is required. The best method is by supra-pubic pressure. It can be combined with traction on the body. Get somebody to press firmly on the uterus through the abdominal wall, then place the body of the child on the left arm, and pass the fingers of the left hand along the vagina into the mouth of the child or on each side of its nose. The right hand should either grasp over the shoulders or its fingers should be passed into the vagina against the occiput. The body of the child is then swung as far forward as possible towards the mother's abdomen, and the head flexed and levered out as it were. Care must be taken not to draw the head out quickly as the perineum may be badly torn. Supra-pubic pressure is by far the best method, and should always be practised along with traction, if it is not sufficient alone. The patient should lie on her back.

If the face rotates towards the front, the child's body should be swung back towards the mother's back, and the face brought out first.

In putting traction on the body of the child, care must be taken not to injure the neck, and if the fingers are hooked into the mouth, not to tear the cheek or break the jaw. If there is any delay, the child will be born asphyxiated, so in every case preparations for reviving it should be made beforehand.

If a head is impacted so that it cannot be delivered by supra-pubic pressure and traction, forceps may be applied to it. If this fails, it will be necessary to perforate it.

A nurse can quite well deliver an ordinary breech case, but it is very difficult to decide whether or not the after-coming head will give trouble. If the pelvis is contracted in the least it will be almost sure to do so. On the whole, it would be best for assistance to be sent for when a breech is diagnosed. When the head is jammed, it is too late to send for help to save the child's life. With an impacted breech, the nurse should not attempt delivery unless she cannot get skilled assistance. A leg will have to be brought down or traction made by hooking a finger into the fold of the groin or passing a fillet through it. A blunt hook is sometimes used, but it is apt to do harm. The thigh bone may easily be broken. Forceps may be applied to the breech, but they are apt to slip.

Transverse or cross presentations.—The long axis of the fœtus lies across the long axis of the mother. Some part of the trunk presents. As it is most frequently the shoulder, these cases are often spoken of as shoulder presentations. The hand, arm, elbow, or ribs may be the part felt. They occur about 1 in 250 cases.

Causes.—Prematurity, death of the fœtus, contracted pelvis, excessive liquor amnii, twins, tumours, obliquity of the uterus and placenta prævia.

Diagnosis.—On inspecting the abdomen the uterus will occasionally be noted to be broader than usual, and, on palpating, the long axis of the fœtus will be found lying across the long axis of the mother. The hard rounded head will easily be made out lying to one or other side, and the breech at the opposite side. The fœtal heart will be heard below the umbilicus.

Vaginal examination.—The presenting part will at first be high up and very soft. The membranes, if intact, will usually project in a sausage shape. If the shoulder can be reached, three bony ridges will be felt, viz., the clavicle or collar bone, the humerus or upper arm bone, and the spine of the scapula or shoulder blade. If the finger can be passed into the axilla or arm pit, the ribs can be felt. If a hand is felt, it can be distinguished from the foot in the fingers being of unequal length, the thumb being easily separated from the others or bent over the palm, and the heel being absent. If you can grasp the hand with your right hand as in shaking hands, it will be the right hand of the fœtus, and if you have to use your left hand to do this, it will be the left hand. The elbow is a little difficult to tell from a knee, but it is pointed with a hollow at each side, while the knee is flatter with a hollow in the centre and a prominence at either side. If you are in doubt, try to reach the hand or foot. When the side of the chest presents, you will feel the ribs.

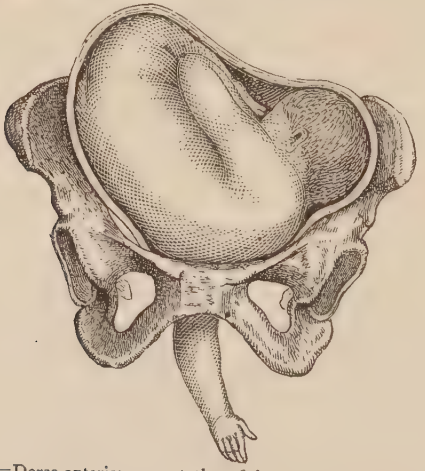

Fig. 39.—Dorso anterior presentation of the arm, L.A.A. (Playfair.)

Prognosis.—The risk to the mother is very great if

the labour is far advanced in the second stage before there is any interference. The woman may die of exhaustion, of rupture of the uterus, from the result of operative interference, or from hæmorrhage or sepsis. The risk to the child is exceedingly great. A living full-time child can hardly be born by natural efforts. The risk arises from pressure interfering with the placental circulation, and from the risk of artificial delivery by turning.

Positions.—The shoulder or acromion process is the denominator. We may divide the positions into two main ones, viz., dorso-anterior, when the child's back points towards the front of the mother, and dorso-posterior, when

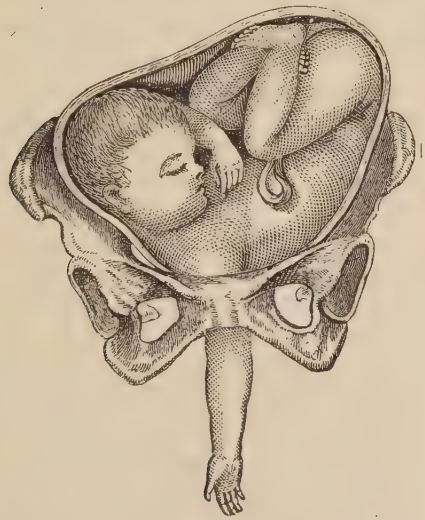

Fig. 40.—Dorso-posterior presentation of the arm, R.A A. (Playfair.)

the back is towards the mother's back. Each of these can again be sub-divided into right and left, giving the ordinary four positions. 1. Left acromio-anterior, L.A.A.;

2. Right acromio anterior, R.A.A.; 3. Right acromio-posterior, R.A.P.; 4. Left acromio-posterior, L.A.P.; according to the direction of the acromion.

Course.—If the child is small, or dead and softened, the labour may end in its expulsion in one of the ways to be described—the uterus may rupture, or the contractions of the uterus may entirely cease, and the labour pass off. This last is a very fortunate ending if there is no assistance at hand. The child will be dead before this happens, and it will soften, so that when labour comes on again in a few days the softened child will be expelled easily.

Mechanism.—In a few cases the head or breech may be substituted for the shoulder early in labour before the liquor amnii has escaped. This may be called **spontaneous rectification.** It probably occurs more frequently than we are aware of. If this does not occur, the shoulder gets driven downwards and forwards under the pubic arch, and then what is known as **spontaneous version** may occur. The lower part of the body and breech are gradually driven past the head until the legs are thrown free. The labour then ends as an ordinary breech. The body turns, as it were, in the uterus. Another natural method of delivery is by **spontaneous evolution.** This occurs with the body in the pelvis. The arm is prolapsed at the vulva, and the shoulder driven downwards and well forwards under the pubic arch, where it is caught. The side of the chest appears at the vulva. The body and legs are gradually driven down past the head and over the perineum, until they are thrown free. The body is turned, as it were, in the pelvic cavity. The labour then ends as an ordinary breech. Delivery by either of these methods can only occur with a small child or with one recently dead.

Another method of delivery is by the doubled up body being driven through the pelvis. The legs and head come

out together last. This can only happen with a dead softened child.

Treatment.—A nurse should never attempt to treat a transverse case, neither should it be left to nature in the hopes of delivery taking place by any of the methods described. The membranes should be kept intact as long as possible. The woman should not be allowed to move about during the first stage, but should lie still in bed. As soon as the os is dilated, the child should be turned. If the liquor amnii has been drained away early in the first stage, artificial dilatation of the os will be necessary. When the liquor amnii has been away for some time, the case is almost sure to become one of impaction, and turning may be a very risky operation, as the uterus may easily be ruptured. In such a case the child will have to be broken up, or decapitation performed.

CHAPTER XX.

COMPLEX OR COMPLICATED LABOUR.

In a complex labour there is danger to the mother and child apart from that due to the presentation. The complication may be either maternal or fœtal.

Maternal Complications.

Hæmorrhage.—This very serious complication may arise—first, before the birth of the child; second, during the third stage of labour; third, after the third stage is completed.

Ante-partum hæmorrhage.—This form of uterine hæmorrhage occurs before the birth of the child. There are two varieties of it—first, Unavoidable, due to placenta prævia; second, Accidental, due to separation of a normally situated placenta.

Unavoidable hæmorrhage or that due to **placenta prævia.**—By the term placenta prævia we mean the implantation of the placenta in whole or in part in the lower uterine segment. The lower uterine segment is that part of the uterus which lies below the retraction ring (see page 151 and plate 26). It is the part of the uterus which stretches as labour goes on. Now, if the placenta is attached to this portion of the uterine wall, its site of attachment must necessarily enlarge as the lower segment stretches, and as the placenta itself cannot enlarge to keep pace with the enlargement of its site, detachment is certain to occur. The utero-placental sinuses are therefore opened, and hæmorrhage occurs. This is why it is known as unavoidable hæmorrhage.

Average of occurrence.—It is said to occur about once in five hundred cases of labour. It is more frequent in multiparæ than in primiparæ.

Time of occurrence of the hæmorrhage.—It usually

occurs from the sixth month of pregnancy onwards to full time. The largest number occurs during the seventh month, and few patients go to full term.

Varieties. — Two varieties are sometimes described, viz.:—first, complete or central; second, incomplete or partial; but more frequently three varieties are given, viz.:—first, complete or central, when the placenta completely covers the os internum; second, partial or lateral, when the os is approached or partially covered by placenta; and third, marginal,* when only the margin of the placenta extends into the lower uterine segment. The latter form is probably more common than is generally supposed.

Source of the hæmorrhage.—The main source of the hæmorrhage is from the utero-placental sinuses, but a little comes from the torn placenta. The blood supply to these sinuses from the uterine arteries is very free. In an ordinary case of labour, when separation of the placenta occurs during the third stage, there is very little bleeding, because the retraction of the uterine muscular fibres compresses and practically closes up the branches of the arteries and veins; but in a case of placenta prævia there is no retraction of the lower uterine segment to do this, therefore the bleeding is profuse.

Causes of placenta prævia. — It arises from a low implantation of the ovum. At the time of impregnation the uterine cavity has been larger than normal, and this has allowed of the ovum slipping down to the lowest part. This explains the greater frequency among multiparæ, and why, when it does occur in primiparæ, they are usually elderly. In some cases part of the placenta forms on the decidua reflexa, and it thus lies low down on the ovum.

Signs and symptoms.—The chief sign is hæmorrhage,

* By some authors the marginal variety is described as that in which the edge of the placenta comes to the margin of the os, while what we have termed the marginal is called partial.

the onset of which, as a rule, is sudden, without any apparent cause. It frequently occurs when the patient is in bed. The first attack may be slight, ceasing in a little, to be renewed in some hours, or days, or even weeks later. On the other hand, it may be very severe and persistent. At first, as a rule, no pains will be felt, but after a time contractions will set in. It is usually stated that the hæmorrhage occurs during the pains, as the placental attachments are then being torn through, and the sinuses opened up. It is also stated that in the next form of hæmorrhage with which we shall deal, viz., accidental hæmorrhage, the bleeding occurs between the pains, and that in this way you can distinguish between the two. As a matter of fact, you can place no reliance upon this statement. While it is perfectly true that the sinuses are torn open during the contractions, yet, on the other hand, in the partial and marginal varieties the presenting part is driven down so tightly against the placenta that it acts for a short time as an effectual plug and stops the bleeding.

If the hæmorrhage is great, the patient will become very pale, and weak, and restless, and complain of faintness, ringing in the ears, and perhaps failure of vision. Her pulse will be very rapid and weak. She is suffering from collapse or shock from loss of blood, and may faint away completely.

A vaginal examination may not reveal much. The os may be completely closed, and the presenting part not felt, as malpresentations are very common, both from the case being, as a rule, premature, and from the altered shape of the uterine cavity. A thickened boggy feeling in the fornices may be made out. In most cases, however, the os will be sufficiently open to allow a finger to pass and the placenta to be felt.

Diagnosis.—In a case of sudden hæmorrhage, from the sixth month onwards to full-time, it must either be due

to placenta prævia or accidental hæmorrhage. The history of the onset will not help you much, so you will have to depend on your examination. If the cervix is not dilated sufficiently to admit a finger, you cannot be absolutely sure which form of hæmorrhage you have to deal with. A boggy, thickened feel in one or other fornix will strongly point to placenta prævia, but this sign is not to be relied upon. If you can pass your finger through the os internum, as fortunately can be done in most cases, you will feel placenta alone in the central variety, and membranes and the edge of the placenta in the lateral. In the marginal variety the finger will have to be passed well in before the edge of the placenta is reached. If you can get your finger in, and do not reach any placenta, it will be a case of accidental hæmorrhage. A blood clot lying in the cervix may be mistaken for placenta. It is smooth, and can be broken down, while the placenta is rough, more like a sponge, and cannot be easily broken down.

Prognosis.—It is a very dangerous condition, especially for the child. If the case be left to nature, both mother and child will run serious risks, but if prompt and proper treatment be adopted, the mother, in ninety-five out of one hundred cases, should be saved. Only about forty out of one hundred children survive. The risk to the mother is greatest in the central, and least in the marginal variety. She may die of hæmorrhage before delivery, or of hæmorrhage after delivery, because post-partum hæmorrhage is common in these cases. She may also die of sepsis, which is very liable to occur after severe hæmorrhage. The risk to the child arises from separation of the placenta preventing its blood being purified, from artificial delivery, and from prematurity. Many of the children are too premature to survive.

Treatment.—Under no consideration should a nurse attempt to treat a case of placenta prævia, unless, of

course, she is in the unfortunate position of not being able to obtain skilled assistance, when it is her duty to do the best she can for her patient. If the patient has lost much blood, she should be kept lying perfectly quiet, with her head low. A little stimulant may be administered —a little spirits or a teaspoonful of sal volatile and water. If there is no active bleeding going on, nothing more need be done until assistance arrives. If active bleeding is going on, the nurse should plug the vagina firmly. The plug may be made of a long strip of lint or a number of pledgets of cotton wool, tied at intervals on a piece of twine or tape—a kite-tailed plug. It should be boiled for a few minutes to render it aseptic. The vagina should be douched out thoroughly and then plugged as full as possible. This will stop the hæmorrhage and also cause dilatation of the os. This is the best method of treatment when the os is not dilated sufficiently to turn the child, or bring a leg down if it is a breech presentation. The plug may be left in for six or eight hours. When a leg is drawn down into the cervix it acts as an effectual plug, controls the hæmorrhage, and causes dilatation. Delivery of the body and after coming head should not be unduly hastened, as if the os is not well dilated, the cervix may easily be torn. This is a dangerous accident in any labour, but much more so with placenta prævia, as the vessels in the cervix are very much enlarged, and fatal post-partum hæmorrhage may occur. If the os is well dilated in the partial or marginal variety with a head or breech presenting, the membranes should be ruptured and the uterus freely kneaded and compressed. When the child is born, the uterus should be firmly compressed. The placenta usually comes away quickly, but if not, it should be removed by the hand. Firm compression of the uterus should be kept up for some time to prevent post-partum hæmorrhage.

The child, if alive, will usually be very feeble, and great care will need to be taken of it. It will probably not breathe when born, so artificial respiration will be required.

Accidental hæmorrhage.—This form of hæmorrhage is also due to separation of the placenta. It differs from placenta prævia in the attachment of the placenta being normal; that is, situated somewhere within the cavity of the body of the uterus above the retraction ring. In both cases the hæmorrhage comes from the torn utero-placental sinuses, the only difference being, that in placenta prævia the sinuses are in the lower uterine segment, and in accidental hæmorrhage they are in the body of the uterus. In both cases only a small amount comes from the torn placenta.

Frequency and time of occurrence.—It is slightly more frequent than placenta prævia, and like it occurs most frequently in multiparæ. It also occurs from the sixth month on to full time.

Varieties.—There are two varieties (1) apparent or external, and (2) concealed or internal. In the apparent or external form, the blood escapes externally, but some clots are usually retained in the uterus. In the concealed or internal, the whole of the blood is retained in the uterus between the wall and the membranes.

Causes.—It may be caused by an accident, such as a blow, fall, or kick, over-exertion, such as lifting a heavy weight, overstretching in hanging up clothes, or reaching an object above the head, or severe strain of vomiting, coughing, etc. In most cases the placenta is more or less diseased, and hence liable to be easily separated.

Signs and symptoms.—These are practically the same as those of placenta prævia, especially in the external form. In the concealed form there is no external bleeding, but a continuous flow of serum. The uterus quickly becomes distended by the blood retained in it, and the pain becomes very severe. The patient will complain

of a continuous rending pain, as if her womb were going to burst. She may become utterly collapsed without any blood showing externally.

Diagnosis.—In the external form the appearance of the blood will indicate that it is either placenta prævia or accidental hæmorrhage. If on examining vaginally you cannot reach placenta, you may decide it is a case of accidental hæmorrhage. The concealed variety is more difficult to diagnose. The patient will show indications of collapse, and will complain of severe continuous pain in the abdomen. The uterus will be very much distended and globular in shape, with probably large boggy masses to be felt in it, indicating clots. There will be a free flow of serum from the vagina. No placenta will be felt at or near the os. In some cases of the concealed variety there is a flow of blood externally, but this is too small in amount to account for the great collapse.

Prognosis.—This is very grave, especially in the concealed variety. In fact, very few of the concealed form survive, as unfortunately the condition is often not recognised until too late. The risks to both mother and child are the same as those from placenta prævia.

Treatment.—The nurse should keep her patient lying perfectly quiet, and send for skilled assistance at once. If the patient is much collapsed, she should be stimulated, and her head kept low. If active contractions are going on and the bleeding continues, the membranes should be ruptured, and a firm binder put on. Artificial dilatation and delivery by turning will often be necessary. Plugging of the vagina is advised by some, but there is always the danger of converting an external into a concealed form, and adding much to the risk to life.

In the concealed form, the only hope lies in forcible dilatation and delivery, or by doing a Porro's operation, *i.e.*, opening the abdomen and removing the uterus.

When the child is delivered, the uterus must be actively compressed and the placenta and clot expelled or turned out with the hand. A douche (120° F.) should be given at once, and firm pressure kept up on the uterus for some time, to check any post-partum hæmorrhage. Ergot should be given to keep up uterine contractions. The subsequent treatment of cases of placenta prævia and accidental hæmorrhage will be dealt with in speaking of post-partum hæmorrhage.

Post-partum hæmorrhage.—As its name implies, this form of hæmorrhage occurs after the child is born. It may be before the placenta is expelled, in which case the placenta will generally be partially adherent, immediately after its expulsion, or some days later. This latter form is known as secondary post-partum hæmorrhage, and it may occur any time during the puerperium.

Primary post-partum hæmorrhage, or that which occurs before or immediately after the expulsion of the placenta, may be divided into, first, **ordinary,** in which the bleeding comes from the placental site; and second, **traumatic,** where the bleeding comes from a tear in the cervix, vagina, vulva, or perineum.

Ordinary post-partum hæmorrhage.—We have already explained how hæmorrhage is prevented in ordinary cases, by the retraction of the uterine muscular fibres closing up the vessels which communicate with the utero-placental sinuses. If the uterine muscular fibres fail to retract, or, in other words, if uterine inertia occurs in the third stage post-partum hæmorrhage results.

We have already dealt with the causes of uterine inertia in the second stage of labour, and the same hold good in the third stage. Hæmorrhage is apt to occur in multiparous women who have borne many children in rapid succession, and when the uterus has been over-distended by hydramnios or twins. In twins you have another cause,

viz., an extra large placental site. After prolonged labour, and also after a precipitate labour, or a too rapid artificial delivery, it is apt to occur. After ante-partum hæmorrhage, either from placenta prævia or accidental hæmorrhage, it is common. In placenta prævia the sinuses lie in the lower part of the uterus, where retraction has very little effect. The clots in them may also be easily displaced. In cases of confirmed bleeders it usually occurs, but you may have it in any case, especially if a bit of placenta or membrane be retained.

Varieties.—There are two varieties. First, external or apparent, which is the commoner; second, internal or concealed, which is rare. In the external the blood gushes out of the vagina, while in the concealed it is retained in the uterus, which becomes distended with it.

Signs and symptoms.—There is usually a great gush of blood into the bed, and the patient becomes very much collapsed, with a feeble, quick pulse. She may faint. The fainting is very alarming, but as a matter of fact it is beneficial, as the bleeding will then cease. The uterus will be found relaxed, and there may be difficulty in defining its shape. In the concealed variety the external bleeding will be small, and not sufficient to account for the feeble pulse and pallor of the patient. The uterus will be found to be very large and fairly firm. The pulse is a good guide. If it is found to become quick, 110 or 120, after labour, it indicates that post-partum hæmorrhage is coming on.

Prognosis.—In bad cases it is an exceedingly dangerous condition, as the woman will bleed to death in a very few minutes.

Diagnosis.—A gush of blood, quickened pulse, and collapse of the patient, with a flabby uterus, indicates the external form, while collapse of the patient, quickened pulse, and distention of the uterus indicates the internal.

Treatment.—If the second and third stages of labour

are properly conducted, post-partum hæmorrhage should rarely occur. The second stage should not be allowed to linger on indefinitely until the uterus is completely exhausted. In every case the hand should be kept on the uterus as the body of the child is being expelled, and during the third stage the uterus should be gently but firmly kneaded, not only until the placenta is expelled, but for ten or fifteen minutes longer, until it is firmly retracted into the familiar "cricket ball" shape.

When the hæmorrhage actually comes on, assistance must be sent for, and prompt measures taken. The uterus should be grasped firmly and rubbed actively to get it to contract. If the placenta is still in the uterus, or if there is much clot retained, the clean hand should be inserted and the uterus thoroughly emptied. The hand should then be closed and the uterus firmly compressed on it through the abdomen. A hot douche (120° F.) should then be given. This will generally cause firm contraction of the uterus and stop the hæmorrhage. The best way to compress the uterus in post-partum hæmorrhage after placenta prævia is to place the closed hand in the vagina, behind the cervix, and crush the uterus down on it by supra-pubic pressure. In the meantime the patient's head should be kept low, and she should lie perfectly still on her back. The foot of the bed should be raised if possible. A dose of ergot, two teaspoonfuls, should be given at the commencement. If it can be given hypodermically it will act much quicker. Three grains of ergotin is usually given in this way. Cold douches were used at one time, but very hot ones (120° F.), just as hot as you can bear your hand in, are by far the best. This is the treatment a nurse can and should adopt if skilled assistance is not at hand. It will usually suffice. Manual compression of the uterus should be kept up for an hour or so.

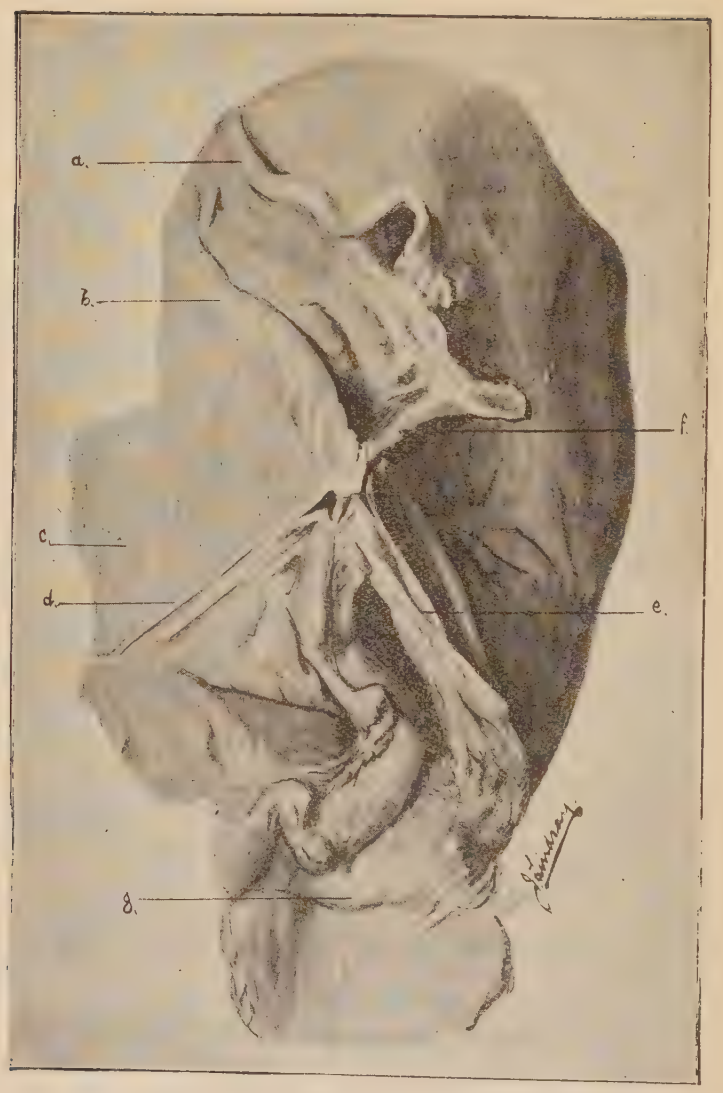

FIG. 41.—Rupture of the cervix extending up into the body of the uterus.

A.—Fallopian Tube. *B.*—Round Ligament. *C.*—Posterior Wall of Bladder. *D.*—Anterior Layer of Broad Ligament. *E.*—Posterior Layer of Broad Ligament. *F.*—United Layers of Broad Ligament. *G.*—Os Externum.

Sometimes injections of per-chloride of iron are used, but the iron corrodes or chars the inside of the uterus, and septic absorption is very apt to occur. We have found injections of 30 grains to the pint of suprarenal gland substance to be very useful. When the hot douche fails, the best method to adopt is to plug the uterus and vagina firmly with an aseptic plug. The uterine cavity must first be plugged, but this is an operation that nurses can hardly undertake.

If the patient is very weak, she should be stimulated freely and given plenty of fluid, such as milk, beef juice, etc. Her body heat should be kept up by placing hot-water bottles about her. The fluid in her vessels may be increased by giving her a large injection of salt water (one teaspoonful of common salt to a pint at 100° F.) into the rectum. A better method is to inject it under the skin of the abdomen or under the breasts. It is quickly absorbed and increases the fluid in the blood-vessels, and gives the heart something to work on until new blood is formed. A nurse can easily give the rectal injection, but the other requires a special apparatus.

During the puerperium the patient must be freely stimulated so long as her pulse is weak and quick, and she must be given plenty of fluid nourishment. She must not be given a strong purgative to move the bowels. Salts should never be given. The greatest care must be taken to guard against sepsis, as there is more risk of it occurring than in an ordinary case.

Traumatic form of post-partum hæmorrhage.—In this form the hæmorrhage comes from a wound or tear in the passages, and not from the placental side.

The wound may be in the cervix (Fig. 41), vagina, vulva, or perineum. If the cervix is badly torn, especially in a case of placenta prævia, the patient may bleed to death very quickly.

Prognosis.—It is only dangerous in a cervical tear, and if this be bad, the risk is very great.

Diagnosis.—There is serious bleeding, although the uterus is firmly contracted. On examining, if the tear is in the vulva or perineum it can be seen, and if it is higher up in the vagina or cervix, it can easily be felt.

Treatment.—Assistance should be sent for at once, but in the meantime the nurse should give a hot douche, and if she can see the bleeding part, apply pressure to it if possible. The tears should be stitched. If this cannot be done to the vaginal or cervical tear, and if the hot douche fails, a very firm plug should be inserted. If the loss is great, the patient must be freely stimulated, have hot bottles placed about her, and be given saline injections.

Secondary post-partum hæmorrhage.—This form occurs during the puerperium. It may recur several times at intervals of days, and may weaken the patient very much. It may occur in cases of primary post-partum, or of ante-partum hæmorrhage.

Cause.—It is practically always due to the retention of something in the uterus. It may be a piece of placenta or membrane, a blood clot, or a small polypus.

Prognosis.—It is dangerous if repeated, especially in cases where there has been post-partum or ante-partum hæmorrhage.

Diagnosis.—The lochial discharge suddenly increases, and becomes bloody if it has already become serous.

Treatment.—The nurse may give ergot and repeat it every four hours, and also a hot vaginal douche. Skilled assistance will be needed, as the uterus must be explored and cleared out.

Hæmatoma.—A hæmatoma, or blood tumour, may form during pregnancy, and, if it be present at the time of labour, may be a cause of obstruction, as has already been mentioned.

It is caused by the bursting of a blood vessel in the pelvic tissues. The blood is poured out into the tissues, and may form a large swelling, which will bulge the side of the vagina. It gradually works its way down, and the external parts of the vulva may become quite black. If the vessel is burst during labour the swelling may not form until a short time after delivery. If it is at all large the patient will feel bearing down, as if there were something to come away from her.

Prognosis.—It is not a dangerous condition unless the clot becomes septic.

Diagnosis.—A boggy swelling will be felt in the vagina, and in a short time the external parts will become blackened.

Treatment.—Care must be taken to prevent sepsis. The clot will gradually absorb. If matter forms, an incision must be made, and the clot cleared out, but this, of course, is not for a nurse to do.

Rupture of the uterus.—We have already referred to rupture of the cervix as a cause of traumatic post-partum hæmorrhage. A slight amount of rupture of the cervix is very common. It usually heals up and gives no trouble.

Rupture of the uterus proper is a very serious complication of labour. It is fortunately not very common.

Causes.—Any cause of delay in the second stage of labour, other than uterine inertia, may bring it about. It is commonest in contracted pelves, transverse presentations, and hydrocephalus. Uterine disease also predisposes to it, and in such cases it may occur spontaneously (Fig. 42) either in the first or second stages of labour, without any obstruction. It may result from operative interference, as in delivering through a partially dilated os, and especially in turning after the lower uterine segment has become dangerously thinned out. Again, in dragging the head through a contracted brim, the promontory may be forced through

FIG. 42.—Spontaneous rupture of the uterus.

the back of the uterus. The administration of ergot in obstructed labour is very apt to cause it. We have already warned against this. Rupture is more common in multiparæ than in primiparæ.

Varieties and site of rupture.—It may be complete, *i.e.*, through the wall right into the abdomen, or incomplete or partial through the muscular layer only, and not through the serous one (Fig. 26). It may be tranverse, oblique, or longitudinal, and situated in any part of the body, but most frequently in the lower segment, which thins out during labour.

Indications.—The labour is prolonged and the uterine contractions strong. The lower uterine segment is thinned out and the retraction ring easily felt. The rupture may be sudden, following a strong contraction, or it may be more gradual. When it is complete the pains cease, and the patient may feel ease, but symptoms of collapse quickly appear. There may be no great external bleeding. The presenting part usually recedes, and if the rupture is complete the fœtus may escape into the abdominal cavity.

Diagnosis.—There is sudden cessation of violent contractions, followed by collapse. You may be able to make out two tumours in the abdomen if the fœtus has escaped into it, viz. :—the fœtus and the body of the uterus. The presenting part will have receded, and the tear may be felt if it extends into the vagina. There will also be considerable hæmorrhage from the vagina.

Prognosis.—It is the most fatal accident which can occur in labour; about 90 per cent. of the cases of complete rupture die. The patient may die in a very few hours of shock and hæmorrhage, or several days later of septic peritonitis. Very few of the children survive.

Treatment.—Prevention is better than cure—so that a nurse should always send for assistance early in every case of obstructed labour. While it is not always possible

to prevent rupture occurring, the majority of cases should be prevented by early and judicious treatment. When the rupture has once occurred, a nurse can do very little except send for aid as quickly as possible. The patient should be kept perfectly quiet, and be given some stimulant, and have hot bottles placed about her.

Inversion of the uterus.—By this is meant the turning inside out of the uterus. It may occur independently of labour, but is most frequent in connection with it, immediately after the child is born.

It may be partial or complete, and may occur before or after the placenta is separated or expelled.

Causes.—The most frequent cause is pulling on the cord to remove the placenta If the placenta is adherent to the fundus, it is easy to see how the uterus may be turned inside out when the cord is pulled on. It may be caused (especially in the partial form) by pressing the fundus with the tips of the fingers, instead of grasping it with the hand, in applying suprapubic pressure. If partial inversion occurs, it is almost sure to become complete, because the lower part of the uterus will act on the inverted portion, as if it were a foreign body, and try to expel it.

In some cases it occurs without any mismanagement, probably from a part of the uterine wall being diseased.

Signs and Symptoms.—If it is complete, the patient will show marked signs of collapse, with severe bearing-down pain in the lower part of abdomen. There will probably be considerable hæmorrhage.

Diagnosis.—On palpating the abdomen, the fundus of the uterus cannot be felt, and if the abdominal wall is thin, an inverted cup may be felt. On making a vaginal examination, a rounded mass will be felt. If the placenta has not been expelled, it will be found attached to it. On carrying the fingers round the mass, it will be found attached to the roof of the vagina, no rim of the cervix being

felt. In the incomplete variety, if it be fairly marked, the fundus will not be felt in the abdomen, and a rounded mass will be found protruding through the external os.

Treatment.—The nurse should send for assistance at once. If there is much hæmorrhage, she should firmly plug the vagina. The uterus will have to be returned, and the sooner this is done the better.

Hour-glass contraction of the uterus.—In this condition there is a spasmodic contraction of part of the uterus which causes the placenta to be retained. This is generally described as due to spasm of the internal os, but it is really due to spasmodic contraction of the retraction ring.

It may be caused by the improper use of ergot before the placenta is expelled, or by some irritation in the neighbouring organs.

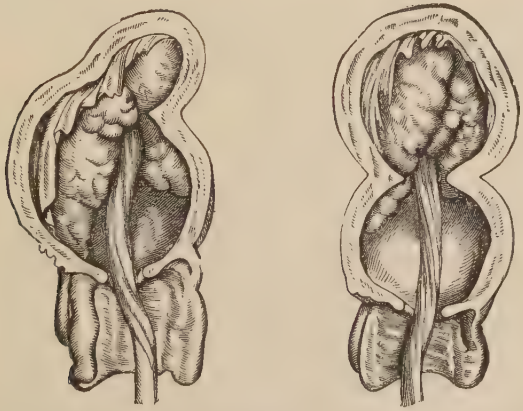

Fig. 43.—Irregular contraction of the Uterus, with Encystment of the Placenta (Playfair.)

Diagnosis.—On passing your fingers in along the cord, the lower portion of the uterine cavity is found quite flaccid, and a constricting ring, through which the cord leads, is felt at the top.

Treatment.—A nurse must send for assistance, as chloroform will have to be given to relax the spasm and allow of the placenta being removed.

Adherent placenta.—In this condition, the placenta is so firmly attached to the uterine wall that the natural efforts of the uterus fail to separate it. It is due to disease of the placenta or decidua.

The whole placenta may be adherent, or only a part of it. If the whole is adherent, there will be no bleeding, but if only a portion adheres, the bleeding will be profuse, and will continue until the adherent part is separated, as it prevents retraction of the uterine muscle.

Prognosis.—It increases the risk of labour, because it predisposes to both primary and secondary post-partum hæmorrhage, and also to sepsis.

Diagnosis.—If, in half-an-hour or so after delivery, firm compression of the uterus (Crédé's method) fails to expel the placenta, it is probably adherent.

Treatment.—Skilled assistance should be sent for, but a nurse should know how to act herself, as she may be unable to obtain assistance at once, and, if the bleeding be profuse, she may not be able to wait. The hands should be rendered thoroughly aseptic, then the external parts of the patient should be treated in the same way. With the patient lying on her back, the right hand should be passed into the uterus along the cord, until the placenta is reached. The uterus should be steadied by the left hand over the abdomen, while the placenta is stripped off by inserting the edge of the right hand between it and the uterine wall. When it is all off, grasp it and withdraw it. The whole of the membranes must also be peeled off and removed. A hot antiseptic douche should be given at once.

CHAPTER XXI.

COMPLEX LABOURS—*Continued.*

Eclampsia or Puerperal Convulsions.

This is the name given to fits very like epileptic ones, which may occur during the later months of pregnancy, during labour, or during the puerperium.

The exact cause of eclampsia has not yet been definitely determined. It is probably due to a poison retained in the system which should have been eliminated by the kidneys. The nature of the poison is not known. It acts on the nervous centres and causes the fits.

Fig. 44.—Œdema of the Vulva.

In the majority of the cases the urine is scanty and contains more or less albumen. There is generally swelling of the limbs, body, and face, especially puffiness under the eyes, and the labia may be very oedematous.

Frequency.—Eclampsia occurs about once in 500 cases. It is much commoner in primiparæ than in multiparæ. In every hundred cases, about sixty begin during labour, twenty before labour sets in, and twenty during the puerperium.

Premonitory symptoms.—For a short time before the actual fits occur, the patient generally suffers from severe headache, attacks of giddiness, occasionally partial or complete failure of vision, and sometimes of consciousness. In some cases there may be no premonitory symptoms at all, except severe sickness just before the fits.

The fit proper is exactly like an epileptic seizure, except that there is no cry. There is sudden contraction of the muscles of the body, causing rigidity, quickly followed by spasmodic or jerky movements. If you are observing the patient closely, you will notice that the eyes are fixed and staring, with the pupils widely dilated, for a very little, and then twitchings begin in the facial muscles and the head is rolled from side to side. The twitchings quickly become general, and the whole body works spasmodically. The contortions of the face, which becomes livid, give a horrible appearance to the patient. The tongue is usually bitten. The breathing becomes irregular and hurried, and froth, tinged with blood, exudes from the mouth. Urine and fæces may be passed unconsciously. The fit lasts from one to three minutes. The patient is quite unconscious during the time, and may remain partially or entirely so after its cessation. Other fits usually follow at longer or shorter intervals. She may be conscious between them, but, if they succeed each other rapidly, she will gradually become comatose. A very large number of fits may occur.

Prognosis.—The risk to the mother is great. More than 20 per cent. die. The risk is greatest in cases occuring before labour, and least in those which occur during the puerperium. The risk to the child is very great. It is

often born dead, and, if born alive, it may take convulsions and die of them. The convulsions may attack it in the uterus. The child's urine may contain albumin. Eclampsia seldom recurs in subsequent pregnancies.

Diagnosis.—When the actual fits come on you cannot mistake them, but one should be able to recognise when there is danger of the fits occurring. If a patient complains of headache, dimness or failure of vision, and you find her legs and feet swollen, and puffiness under the eyes, you should examine her urine by boiling it in a test tube or spoon after adding a drop or two of vinegar to it. If it throws down a white cloud, you may diagnose that eclampsia is likely to occur.

Treatment.—In every case of albuminuria of pregnancy the patient should be kept on milk diet, and be given saline purges and medicine to increase the flow of urine. The onset of actual fits can generally be prevented by these means. Unfortunately the fits have come on in most cases before the patient is seen. In the actual seizure the nurse should prevent the patient biting her tongue by placing a piece of rubber, cork, or cloth between her teeth. She must not be allowed to hurt herself in her struggles. Skilled assistance must be called in at once, but, in the meantime, the nurse should give an enema to try to clear the bowels.

In the treatment of eclampsia many different drugs are employed, such as chloroform, chloral, bromide, morphia, tincture of veratrum viride, etc. Bleeding is a very old remedy.

The most reasonable form of treatment is to try to get the poison eliminated from the body by getting the bowels, skin, and kidneys to act as freely and promptly as possible. This can be done by giving a strong purgative, like croton oil (1 to 3 drops), or Epsom salts, putting the patient in a hot bath or hot pack, and giving large injections of saline

fluid under the skin. Chloroform, or some other drug, should be used to control the fits. Rapid delivery is frequently necessary.

After delivery, the action of the bowels, skin, and, kidneys must be kept up. Care must be taken to prevent hot bottles touching the patient's skin during the unconscious stage. The vitality of the tissues is so low that a hot bottle, which would do no harm under ordinary conditions, may cause a severe burn to an eclamptic patient. The bottles should be covered with thick flannel, and a blanket should be placed between them and the patient. The patient should lie between blankets, and great care should be taken to prevent a chill. The lungs are usually œdematous, and if the patient has been exposed to a chill, bronchitis or pneumonia not unfrequently arises.

The diet should consist entirely of milk until the albumin has disappeared from the urine. To flush the kidneys, large quantities of cream of tartar and lemon drink (Imperial drink), should be given.

CHAPTER XXII.

COMPLEX LABOURS—*Continued.*

Fœtal Complications.

Prolapse of the cord.—In this condition a loop of the cord is found hanging in front of the presenting part. The membranes may or may not be ruptured. When the membranes are unruptured the condition is usually called a **funis presentation,** but this is an unnecessary distinction. This condition may be met with in an ordinary labour, but it is much more common in mal-presentations, as transverse or breech, and especially with contracted pelves.

Prognosis.—It does not add any risk to the mother except the risk of artificial delivery, but it is a dangerous complication for the child. The prolapsed portion of the cord becomes squeezed between the presenting part and the pelvis, and the placental circulation is interfered with.

Diagnosis.—Before the membranes rupture it can be felt inside of them, and after they rupture the loops of it can easily be made out. In the majority of cases it is not down before the membranes rupture, but is swept down by the rush of liquor amnii, hence the reason of always examining immediately after the waters break.

Treatment.—The first thing to decide is whether or not it is pulsating. To do this, grasp a loop between your finger and thumb during a pain, and also in the interval between the pains. If it is pulseless between the pains the child will be dead, but it may be pulseless during a pain from pressure, and pulsation be re-established in it as

soon as the pain ceases, hence the necessity of testing during the interval between two pains. If the cord is pulseless and flaccid between the pains, showing that the child is dead, leave it alone. If it is pulsating, try to replace it by pushing it above the presenting part. If it is hanging out at the vulva carefully cleanse it. The best way to replace it is to place the patient in the knee-elbow position, and then push the cord up. In this position the cavity of the uterus is much lower than the vagina, so the cord will tend to fall into the uterus. If it does not stay up, then, unless natural delivery takes place very quickly, artificial delivery by turning, or forceps, will be necessary to save the child. Skilled assistance will be required for this. If you cannot get it to stay up, try to keep it at one or other side of the pelvis, as at the side of the pelvis the pressure upon it will be less than if it were nipped between the head and promontory or symphysis pubis.

Fig. 45.—Postural treatment of prolapsed cord. (Playfair.)

Multiple pregnancy.—Twins occur about once in every 100 pregnancies. They very frequently run in families,

i.e., the tendency to twin-bearing is hereditary. Occasionally three children (triplets) are born at once, and even four have been born alive and survived. The birth of more than two children at once is exceedingly rare. In multiple pregnancies labour very often comes on before full time. Occasionally one of the fœtuses is dead. The dead one may have perished some months before full time, and it may be quite flattened out or compressed. It is then known as **papyraceous fœtus.**.

Labour may be somewhat prolonged in the first stage by the over-distension of the uterus, but, as the children are usually smaller than in single births, the second stage may be short.

Prognosis.—The risk to the mother is increased somewhat during pregnancy by the greater strain on the kidneys, rendering eclampsia more likely to occur. During labour there is increased risk from over-distension of the uterus prolonging the first stage. The large placental site also predisposes to post-partum hæmorrhage and sepsis. The risk to the children is about five times greater than with single births.

Diagnosis.—The presence of twins can be ascertained during pregnancy by careful palpation and auscultation, but, as a rule, the second child is only diagnosed after the birth of the first. The diagnosis may also be made by feeling two bags of membranes, or parts of two children presenting.

Management.—If two bags of membranes present with a breech in one and a head in the other, as soon as the os is dilated rupture the bag containing the head. When the first child is born, tie the cord carefully in two places, so as to prevent hæmorrhage from the end next the mother. The uterus usually remains quiet for half-an-hour or so before contractions set in again. It should be gently kneaded to stimulate it. If pains do not recur in an hour,

assistance should be sent for, as artificial delivery should then be adopted. Of course, if there is a mal-presentation of the second child, assistance should be sent for at once.

Fig. 46.—**Twin pregnancy**—head and breech presentation. (Playfair.)

As the second child is being expelled, the uterus must be carefully followed down with the hand. Compression of it must be kept up for some time after the third stage is over, to guard against post-partum hæmorrhage. There may only be one large placenta or two smaller ones. If the placentæ are separate, that belonging to the first child may be expelled before the birth of the second child. When this occurs, a careless attendant might make the mistake that it was an ordinary single birth, and leave the patient before the second child was born. We have known this to have occurred. The large size of the uterus should at once make you suspect the presence of a second child.

Malpresentations are common with twins. One or both may show this.

Locked twins.—In this condition the body of the first child is expelled breech first, while the head of the second is presenting at the brim, and the two heads have thus become locked. A nurse cannot manage such a condition, but she may prevent it, if she should get the case soon enough, by rupturing the bag of membranes containing the head, and not that containing the breech. In such a condition the body of the first child will usually have to be cut away to allow of delivery of the second. The first child will be dead, so there need be no compunction in decapitating it. The head will have to be removed from the uterus after the second child is delivered.

A lesser degree of locking occurs when both heads present, one slightly in advance of the other, so that the second one is entering the brim along with the chest of the first child.

Labour in a double uterus.—The uterus is sometimes double. Each half has its own ovary and Fallopian tube, so that you may have a pregnancy in one side, or in both sides together. When one half only is pregnant, menstruation may go on from the other half during the pregnancy. The two sides may not be impregnated at the same time, but at intervals of several months. When the one first impregnated reaches full time, labour will come on in it, and the other side may or may not expel its contents. If both sides expel their contents, a mature and a premature child will be born, but it is quite possible for the second half to go to full time, and then you have the curious condition of a woman giving birth to two mature children within two or three months of each other.

When both sides are pregnant, the same difficulties may occur as in a twin pregnancy, viz.:—locking, or both presenting parts being simultaneously driven into the brim. With one side pregnant, the non-pregnant half, which is sure to be enlarged, may obstruct. The uterine

contractions are sure to be weak, as the walls are ill-developed. Malpresentations are common, and the uterine axis does not correspond with the axis of the brim of the pelvis, so dilation will be slow.

Diagnosis.—This is not always easy. Abdominal palpation may show the double condition. The vaginal examination may reveal the fact that the vagina is double with an os in each vagina, but the vagina may be single, and you will then find a double os.

Treatment.—A nurse should not attempt to deal with such a case, as artificial delivery will probably be necessary.

CHAPTER XXIII.

OBSTETRIC OPERATIONS

From time to time we have made mention of operations which require to be performed to effect delivery in certain cases. The performance of these is outside a nurse's duties, but, as she will frequently have to assist, she must have a knowledge of them to enable her to do so intelligently.

Application of forceps.—Labour has to be terminated by the use of forceps under various conditions, *e.g.*, uterine inertia, large size of the head, malpresentation, malposition of the head, rigidity or narrowness of the soft parts, a moderate degree of contraction of the pelvis (conjugate vera, not below three inches), and also cases where rapid delivery is called for in the interest of the mother or the child.

Preparations.—There must be a plentiful supply of hot and cold water at hand. If the instruments are not aseptic, they should be boiled for a few minutes. They should be placed either in a basin of warm lysol solution, or better, in a jug of the same. If there is any chance of a douche being required after delivery, it should be made ready.

The patient's rectum and bladder must be emptied, and the external genitals very thoroughly cleansed with an antiseptic lotion, such as lysol. Chloroform is not absolutely necessary, but it should, as a rule, be given. If the doctor is alone, the nurse may have to watch the patient when under its influence. The patient may lie on her back, or as is usual in this country, on her left side, across the bed,

with her legs drawn up and hips well out over the edge. The bed should be properly protected by a waterproof sheet and draw sheet.

The instruments should be placed within reach of the operator, so that he can take them out of the solution himself. The nurse should stand at the edge of the bed, behind the buttocks of the patient. As soon as the left or lower blade is applied, she will be asked to steady the handle, which she can do with her right hand. The right thigh must be supported while the right or upper blade is being applied. The nurse can easily do this with her left hand by leaning over the patient. During traction the right thigh will have to be supported, especially when the head comes low down, as the handles of the instrument sweep forwards. As soon as the head is delivered the blades are taken off. The nurse should then place her hand on the fundus and follow it down as the body is being expelled, keeping her hand there until the doctor relieves her, when she can attend to the child. A douche is not usually necessary after the third stage is completed unless there be hæmorrhage. In cases of inertia uteri, hæmorrhage may come on, especially when the patient is under chloroform—so that in such cases a douche should always be prepared beforehand.

Version or turning.—In this operation, the child is brought down feet first, *i.e.*, the presentation, which may have been a head, shoulder, face, or brow, is changed into a footling one. In transverse cases it should always be done, if they are seen before the uterus is too firmly contracted round the child. It is very frequently done in cases of placenta prævia, and also in flat pelves.

There are two varieties, first—Internal or podalic version, where the hand is passed into the uterus, one or both feet grasped and drawn down; or, second—Bipolar, where the child is gradually tilted round by pressing the presenting

part away from the os by two fingers in the vagina, while the upper part of the child is pushed in the opposite direction by the other hand over the abdomen. When the foot or knee comes within reach of the fingers in the vagina, it is seized and brought down. The membranes are ruptured to do this. This is a most important method in placenta prævia, because it can be done before the os is wide enough to allow the hand to pass into the uterus.

Preparation of the patient.—The rectum and bladder must be emptied, and the external genitals thoroughly cleansed with an antiseptic. The patient should be well across the bed with her hips at the edge. She may lie on her side, but the back position is preferable. Chloroform should be given, especially if the liquor amnii has been drained away, as it will relax the uterus. The nurse will have to support the patient's legs, and when the body is brought down she should put on suprapubic pressure, to assist delivery, as in an ordinary breech case. An intra-uterine douche will probably be necessary if the hand has been passed into the uterus, so it should be prepared beforehand.

Craniotomy.—This is a very serious operation, in which the child's head has to be perforated and broken up before delivery. Contraction of the pelvis is the commonest condition in which it has to be done, but any obstruction to delivery, such as a tumour or too big a head, may make it necessary.

The instruments should be boiled and soaked in lysol, and the patient prepared as for forceps. Plenty of solution for douching should be ready. The dorsal position, with the hips at the edge of the bed, is the best. Chloroform is absolutely necessary.

The head has first to be perforated and the brain cleared out. When the brain is broken up it can be washed out by douching. The skull must then be crushed.

or broken up, bit by bit, until the diminished head can be brought through the pelvis. If the obstruction is great the body may also require to be perforated.

After delivery, the uterus must be very thoroughly douched out, and, if the perineum or vagina is torn, stitches must be put in.

Induction of premature labour.—A child is viable from the seventh month onwards, *i.e.*, it may survive if born. Premature labour, as you know, not unfrequently comes on of itself, but there are cases in which it is justifiable to bring it on, either in the interests of the mother or of the child. The mother may have some serious disease (*e.g.*, of the heart, kidneys, or nervous system), which can only be benefited by terminating the pregnancy before full-time. In cases of uncontrollable vomiting this may be the only hope of saving her. The most frequent cause for induction, however, is contraction of the pelvis. A live child may be delivered at the seventh month through a true conjugate of $2\frac{1}{2}$ inches, but if the pelvis is smaller than that, there is little hope of the child being alive.

There is a popular belief that a seventh month child is more likely to live than an eighth month one, but this is a delusion. The nearer full-time the better chance there is of its surviving.

Methods of bringing on labour. — There are various methods, but the one most frequently adopted is that of passing one or more gum elastic bougies into the uterus, between the uterine wall and the membranes. The bougies separate the membranes slightly, and also act as foreign bodies in the uterus, so that contractions are set up and labour comes on. Labour does not come on immediately, and it may be several days before delivery is effected. In some cases it will be necessary to dilate the cervix by means of bags or the hand.

Preparations.—The gum elastic bougies, which must be

new, should be well washed with soap and water, and then soaked for several hours in 1 to 20 carbolic or 1 to 1000 perchloride of mercury solution. They may be boiled, but this is apt to injure them. Catheters should never be used, as you can never be sure of rendering them aseptic inside.

The patient's bowels should be thoroughly cleared out, and before the bougie is introduced the external genitals must be cleansed with an antiseptic. A vaginal douche is given as a rule, and the bougie gently passed in until the end of it lies at the os. Several may be introduced. An aseptic vaginal plug is then inserted. This keeps the bougies from slipping out, and also has some influence in causing dilatation. The bougies may be removed in twenty-four hours, when, as a rule, the os will be dilated somewhat. If labour does not come on, it may be necessary to introduce another set. Care must be taken to keep the membranes intact until the os is fully dilated. Unfortunately the labour has frequently to be terminated artificially, as abnormal presentations are common, and if the pelvis is much contracted the head may be too large to pass without assistance. Artificial delivery lessens the chance of the child being alive or surviving delivery.

As the child will be feeble, the greatest care must be taken of it. If it is under three pounds in weight, the utmost difficulty will be found in rearing it. It should be rolled in cotton wadding and kept as warm as possible. In hospital it will usually be kept in an incubator at a temperature of over 90°. In private houses an incubator can be improvised out of a basket or box placed near the fire with screens round it. By means of hot-water bottles round the child, the temperature can be kept up. If possible, the services of a wet nurse should be obtained, as this will give the baby the best chance.

Cæsarean section.—In this operation the abdomen is

opened, and the child removed through an incision made in the anterior wall of the uterus. The placenta and membranes are also removed through the opening, which is then carefully stitched. If it is desirable to prevent future conceptions, the Fallopian tubes are tied in two places and divided. The abdominal wound is then closed after carefully cleaning the peritoneal cavity of clots or liquor amnii which may have escaped into it.

In some cases it is necessary to remove the entire uterus. This is known as Porro's operation. The cervix is clamped by means of a wire ecraseur, as low down as possible, and the uterus cut away. The stump of the cervix with the clamp still on, is fixed in the lower end of the wound by means of long pins passed through it to keep it in position. The abdominal wound is then closed after cleansing the peritoneal cavity.

Cæsarean section is called for when the pelvis is very small, say with a true conjugate of $2\frac{1}{2}$ inches or under, or where there is a tumour completely blocking the passage. It is occasionally done post mortem, *i.e.* immediately after the sudden death of the mother. After the death of the mother the child may live for twenty minutes or so in the uterus, so, if Cæsarean section is promptly performed, its life may be saved.

The operation may be done before labour sets in, but in most cases labour has come on. The sooner it is done in labour the better, before the woman becomes exhausted.

Preparation of the patient.—The bowels must be very thoroughly cleared out, and the bladder emptied by catheter just before the operation. The pubes must be shaved and the abdomen made as aseptic as possible, by washing with soap and water, turpentine and spirit, and applying a wet 1 to 20 carbolic dressing for an hour at least. Care must be taken to thoroughly clean the umbilicus.

During the operation great care must be taken with the sponges, and they must be carefully counted before the abdomen is closed, to make sure that none are left in the cavity.

The nursing of the patient will not differ from that of an ordinary abdominal section, except that her diapers will have to be changed frequently, just as in an ordinary case of labour. The urine will have to be drawn off a few times. To prevent sickness and relieve thirst, sips of very hot water are usually given for the first few hours. If all goes well, the patient is usually able to nurse her baby after a few days. She should be kept in bed for about four weeks, to allow the abdominal wound to become soundly healed.

Symphysiotomy.—This is an old operation which has recently been revived. It is of use when the pelvis is not markedly contracted, *i.e.*, when the true conjugate is not below 3 inches. The pubic symphysis is cut through and the bones allowed to separate. The child is then delivered by means of forceps or turning. The pubic bones are then brought together and the parts stitched. The pelvis must be firmly bound by means of strips of adhesive plaster and a very firm binder.

Before the operation, the parts must be shaved and cleansed in the same way as for a Cæsarean section. In the after-treatment, the patient must be kept lying very still on her back. The urine will require to be drawn off for several days. When the binder is soiled, it must be changed with great care, the pelvis being firmly grasped to prevent the bones separating. The patient will have to lie for a month or six weeks, to allow the parts to unite as firmly as possible before she attempts to walk.

CHAPTER XXIV.

COMPLICATIONS OF THE PUERPERIUM.

The minor complications of after-pains and retention of urine have already been discussed in dealing with the normal puerperium.

Serious Complications of the Puerperium.

Puerperal Sepsis.—This is the most dreaded of all complications. It arises directly from the action of certain forms of micro-organisms which gain access to the system through the genital tract, either at the time of labour or during the puerperium. In a few rare cases the micro-organisms may be present in the system before labour, as when there is an abscess in the pelvis, but in nearly every case they are introduced from without. They may be introduced from the hands, instruments, swabs, diapers, etc., not being perfectly aseptic, or from the external parts of the patient not being clean. In a few cases, where the house drains are at fault, sewage gases may be the source.

Puerperal sepsis is a preventable disease; it is therefore our duty to try to prevent it by every means in our power. Prevention lies in absolute cleanliness on the part of the attendants, the patient, and everything which comes in contact with the patient.

Sapræmia.—This is the mildest form of sepsis. The disturbance is due to absorption of the products of putrefaction (ptomaines) in the vagina or uterus. In every labour there is more or less dead tissue to be got rid of in the discharges. If the micro-organisms of putrefaction

gain access to this tissue they at once begin to flourish, and their products are absorbed into the system. If their action is confined to the vagina alone, the disturbance of the system may not be great. The temperature and pulse may not rise much, but the lochial discharge will become offensive. The condition is apt to spread up into the uterus, and it then becomes more serious. The cellular tissue between the folds of the broad ligaments becomes swollen and tender. A large mass may form, filling up one or other side of the pelvis. The left side is the one most frequently attacked. This hardness may subside or pus may form in it, and you then have a pelvic abscess. The Fallopian tubes may become involved, and the mischief spread through them into the peritoneal cavity, and set up pelvic peritonitis. In rare cases the whole peritoneum may become infected with general peritonitis, and this may cause the patient's death.

When the pelvis is invaded the temperature and pulse will rise higher. There will be repeated rigors in bad cases, and a great deal of pain and tenderness in the lower part of the abdomen.

If an abscess does not form, the cellulitis will gradually subside, and the patient recover, but she will be left with more or less damage in the pelvis, in the form of adhesions and displacements of the uterus or ovaries, which may cause her considerable suffering for the remainder of her life. If an abscess forms, it may make its way into the bowel, bladder, vagina, or on to the skin surface, and thus discharge itself, or it may burst inwards and cause death very quickly by setting up general peritonitis.

Prognosis.—If the case is promptly treated the risk is not great, but if the case is neglected it may become very serious, and end in general blood poisoning and death.

Septicæmia.—In the more acute form of sepsis, septicæmia—usually known as puerperal fever—the disturb-

ance arises from the direct invasion of the system by certain kinds of micro-organisms. They are the same organisms as those which cause a ute blood-poisoning in any wound. They directly invade the living tissues through a wound, such as a tear in the perineum or cervix, or the raw placental site. When they once gain a thorough footing in the system the effect is generally fatal.

Course of the disease.—The onset rarely begins before the second day, usually from the third to the fifth day, but it may be later. It begins usually with a severe rigor and a rapid rise of temperature (103° to 105°), and of pulse (120). The temperature and pulse remain high. The patient usually complains of severe headache and of feeling very ill. Her tongue is furred and dry. The lochial discharge becomes very scanty or suppressed, and the milk secretion also ceases. The patient has an anxious, pinched look. There is generally a good deal of tenderness over the lower part of the abdomen, and the uterus will be large. The whole abdomen may become distended and tender. Occasionally a red rash appears on different parts of the body. The bowels are usually constipated, but there may be bad diarrhœa. In rare cases the patients profess to feel quite well and may want to get up, although manifestly very ill. You must not be deceived by this, as it is one of the most fatal forms of the disease.

Prognosis.—The risk is exceedingly great. In fatal cases death may ensue in a few days, and is seldom delayed beyond two weeks. Probably two-thirds of the cases die.

Pyæmia.—Pyæmia may be looked upon as a chronic form of blood-poisoning. It is due to practically the same organisms as septicæmia. In septicæmia the action of the organisms is so quick that the system is violently poisoned, while in pyæmia the action is slower,

and there is time for certain changes to take place in different parts of the body.

Course of the disease.—The onset does not, as a rule, occur until the ninth or tenth day of the puerperium. The patient may have had an apparently normal puerperium until then. In some cases, however, it follows sapræmic absorption. It usually begins with a severe rigor and rapid rise of temperature (103° to 105°) and pulse. In a short time the temperature and pulse may fall to normal or nearly normal, but in twelve or twenty-four hours there is another rigor and elevation of temperature and pulse, and this may be repeated at intervals. The temperature now remains above 100°, and may rise to 105° or 106°. The temperature chart will show marked rises and falls.

In several days, or it may be a week, abscesses show themselves in different parts of the body, either in the joints or under the skin, or they may be inside the body, in the lungs, liver, or brain. As each abscess forms there are rigors.

Result.—If the abscesses are superficial and are properly evacuated, the patient is likely to recover, but if they are numerous and large, she may die from the exhaustive suppuration. If they are internal, especially in the brain, they are generally fatal.

Prognosis.—It is very grave, but not so grave as in septicæmia.

Treatment.—Prevention is better than cure. Preventive treatment consists in absolute or surgical cleanliness on the part of the attendant, the patient, and everything that touches the patient. The labour must also be properly conducted, as regards ending it within a reasonable time, before the parts have become injured by pressure, or the patient exhausted. Care must also be taken to thoroughly empty the uterus and get it well retracted.

If sapræmia occurs, a purgative should be administered. Free action of the bowels will relieve the system of poison, and while the bowels are acting the uterus and vagina will be freely drained. To ensure this, the patient, if strong enough, should sit on the utensil. She should lie with her shoulders raised, so as to allow of free drainage. Copious hot antiseptic vaginal douches should be administered twice daily. If this does not bring the temperature down, the nurse must seek assistance, as an intra-uterine douche will likely be required. The best form of antiseptic douche to use is one of perchloride of mercury. One in 4000, is strong enough for a nurse to use.

In cases where the pelvic tissues are involved, a nurse must not delay getting assistance. Besides douching, poulticing will probably be required, and drugs will have to be administered for the pain and fever. Opium and quinine are frequently given. If a pelvic abscess forms, it should be opened and drained.

In cases of septicæmia a nurse should never attempt the treatment alone. Intra-uterine douching will be required. Drugs, such as quinine and opium, will have to be given for the fever and pain, and the patient's strength will have to be kept up by means of plenty of fluid foods, such as milk, soups, beef extracts, etc., and she will probably require a very large amount of stimulant. Alcohol is of great use in these cases, and, to do good, must be given unsparingly. Good old brandy is the best.

Within the last two or three years a new method of treatment has been introduced, viz., the hypodermic injection of anti-streptococcic serum. It seems to do good in some cases while in others it has no effect.

In the pyæmic form the patient's strength must be kept up, and the abscesses opened whenever they have formed. Douching will probably do more harm than good.

Puerperal septicæmia is a terribly contagious disease,

i.e., it may easily be conveyed from one puerperal patient to another. If a midwife or nurse is attending a case of septicæmia, she should not attend any other confinements until she is free from the septic one. Before resuming work she must thoroughly bath and disinfect herself and all her clothing. She cannot exercise too much care in sterilizing her hands and arms. She should also thoroughly sterilize the contents and the canvas lining of her bag by boiling them. The Higginson's syringe had better be burned. If she takes these precautions she may resume work without fear.

Sometimes a nurse is recommended to take a holiday before resuming work. She may be away for months, and if she does not take the precaution to thoroughly disinfect the contents of her midwifery bag before resuming work, she may convey sepsis to the first patient she attends. Time will not disinfect either clothing or instruments.

Puerperal Ulcer.—When the vagina has been bruised or lacerated, ulceration may take place. A greyish slough forms and separates, leaving an ulcer of varying size. There is usually a considerable amount of foul discharge, and more or less sapræmic absorption, causing a rise of temperature.

Treatment.—Keep the parts thoroughly clean by washing them with an antiseptic solution. The ulcer should be dusted with iodoform powder.

Phlegmasia alba dolens, or white leg.—This is a very painful condition which affects one or both legs. It rarely occurs before the second week of the puerperium. In all cases sepsis is probably present.

The patient is usually seized with a rigor and rise of temperature and pulse. At first there is intense pain in one or both legs. The left leg is the one most frequently affected. The second leg may be affected several days later. The pain may be in the calf of the leg, and spread

upwards along the line of the large veins, or it may be in the groin and spread downwards. In about twenty-four hours the leg begins to swell, and the pain usually lessens. The limb becomes tense, brawny, and of a white colour. It may increase to several times its original size. It is very tender to touch, and the patient will probably be unable to move it. The swelling may not extend much above the knee, but in many cases it extends right up to the body.

The veins are acutely inflamed and the blood clotted in their inside, so that the circulation is practically stopped in them.

The acute stage is usually over in a week or ten days, and then the swelling begins slowly to subside, but it will be six or eight weeks, or even more, before the leg will be anything like its former size, and for a very long time it will tend to swell if the patient is much on her feet. Occasionally suppuration occurs, and numerous abscesses may form in the leg or in different parts of the body, just as in pyæmia. The patient may die from exhaustion, or recover after months of suffering, when the abscesses have all been evacuated.

Prognosis.—It is a dangerous condition, but most of the cases recover under careful treatment.

Treatment.—The part must be kept at absolute rest. To relieve the pain, extract of belladonna and glycerine may be painted over the painful veins, and the whole leg be swathed in cotton wool, or flannel wrung out of hot water and sprinkled with laudanum, may be applied. The foot and leg should be raised and supported on pillows. As soon as the acute stage is past, the foot and leg should be rolled in cotton wadding, and a flannel bandage be put on from the toes right up the whole length of the limb. The pressure assists absorption. The leg should not be rubbed or massaged, as there is great risk of

detaching a bit of clot which may be carried on to the heart and lungs, and kill the patient in a few minutes. For the same reason the patient must not move the leg, and must not be allowed to sit up too soon.

When abscesses form, they must be opened and drained.

Phlebitis or inflammation of the veins.—Varicose veins in the legs may become inflamed during pregnancy, and occasionally during the puerperium. Hard tender swellings will be felt, especially in the calf of the leg. There is no general swelling of the leg as in Phlegmasia alba dolens.

Treatment.—Keep the part at rest swathed in cotton wadding, and, if there is much pain, apply belladonna or laudanum cloths.

Prolapsed and inflamed piles.—Most women suffer from piles during pregnancy. After delivery the piles are apt to prolapse and become inflamed. A large bluish mass will be seen to protrude from the anus. It will be extremely tender.

Treatment.—Bathe the mass with warm water, then smear it with oil or vaseline and press it up until the piles are returned within the anus. A sedative ointment, such as gall and opium, may be smeared over the mass to relieve the pain, but a $\frac{1}{4}$ grain morphia suppository acts better. If the piles can be kept up, the inflammation quickly subsides.

Embolism of the Lung.

In this condition a clot of blood gets detached, and is carried along the blood stream through the heart into the lungs. The clot may come from the veins of the leg in a case of phlegmasia alba dolens, but the accident not infrequently occurs in cases where there is no indication of clotting anywhere. In such a case the clot probably comes from a uterine vein.

It may occur after a normal labour, without the least previous indication of anything being wrong.

Signs and symptoms.—There is no warning of impending disaster. The patient may be feeling quite well when she is suddenly seized with an intense feeling of suffocation. She gasps for breath, throws her arms out, and perhaps catches hold of her clothing. Her face becomes deadly pale or purple in colour, and death frequently ensues before anything can be done. Sometimes the attack is milder. The feeling of suffocation is similar, but not so great. The patient's mind is clear, and she feels as if she were dying.

Prognosis.—It is fatal in most cases, but a few recover.

Treatment.—Prop the patient up on pillows, and give her as much stimulant as you can get her to swallow. A nurse should, of course, at once send for assistance.

Syncope.—Patients sometimes die suddenly shortly after delivery, or during the puerperium, from failure of the heart's action. This generally occurs in weakly patients, the subjects of serious constitutional disease, such as heart disease, pernicious anæmia, etc. It may occur from shock after a very serious and prolonged labour.

The pulse becomes very quick and weak, and the patient has all the indications of extreme exhaustion.

Treatment.—Free stimulation by the mouth, or better, hypodermically. A mustard poultice or hot fomentation over the heart is useful, and plenty of hot bottles should be placed about the patient.

Puerperal insanity.—Insanity may occur during pregnancy, the puerperium, or lactation. It is much more frequent during the puerperium than in either of the other periods.

There are two varieties, **mania** and **melancholia.** Mania is the commoner of the two, and comes on most frequently during the first fortnight of the puerperium.

Signs and symptoms.—The patient becomes very sleepless, irritable, and excited, laughing at one time and crying at another, without any apparent cause. She will make absurd accusations against those about her, and may take a strong dislike to her infant and those dearest to her. She may become very wild and maniacal. The temperature generally rises. If she is not carefully watched she may do harm to herself, or to her infant.

Melancholia is more apt to show itself later, during lactation. The onset is insidious. The patient becomes morose and silent, brooding over some imaginary evil. She loses interest in life, and does not care for her friends.

Prognosis.—About two-thirds recover completely, some of the remainder die, while the rest remain permanently insane. Melancholia is more likely to terminate in permanent insanity than mania. It may recur in future pregnancies, and is apt to get worse with each successive attack.

Treatment.—The friends usually shrink from placing such a patient in an asylum, but, if she is strong enough for removal, she should be sent there. It will give her the best chance of recovery. The nurse must see that she is strictly watched, and no one who is likely to excite her allowed near her. The child should be taken away entirely. The patient must be freely nourished, and her mind should be occupied by reading or working. The medicinal treatment will probably consist in tonics, with hypnotics if there is sleeplessness.

Mammary Complications.

Excoriation and fissure of the nipples.—The nipples may become excoriated, *i.e.*, the surface layer may be removed. It is common with flat nipples, especially if they are not kept clean. Fissures are apt to occur along with it.

Cracks form in the nipple, usually at the base. They may be so minute as only to be seen with difficulty, but they cause great pain when the child seizes the nipple. The pain may be almost unbearable.

They should be carefully treated, because if any septic organisms get in, inflammation and abscess of the breast will follow.

Treatment.—To prevent them forming, the nipples, if flat, should be carefully drawn out and bathed with a weak spirit lotion during the latter months of pregnancy. When the child is put to the breasts, the nipples should be carefully washed each time before and after suckling.

The excoriations and fissures should be brushed with Friar's balsam, tannic acid and glycerine, or borax and glycerine, and a nipple shield should be used. If the fissures are touched with a fine point of silver nitrate, healing will be hastened.

Inflammation of the Breasts.

If there is a free flow of milk the breasts often become engorged, knotty, and painful. They should be gently rubbed with warm oil and supported by a bandage, and a saline purge given. It may be necessary to draw off the milk by means of an exhauster. Belladonna may be applied to remove the pain and check the secretion.

If the breast becomes acutely inflamed and hard, an abscess is likely to form, especially if the nipple is excoriated or fissured. A chill will predispose to this. The patient becomes feverish, and may have a rigor. The pain in the breast is very acute. The skin becomes red over the hard lump, and, after a day or two, some softening can be made out, indicating that pus is present.

Treatment.—In the early stages the breast should be exhausted, belladonna applied to it, and a bandage put

on to support it, while the bowels should be freely purged with a saline. If this fails to relieve it, and an abscess is evidently forming, boracic poultices should be applied to bring the abscess on, and, as soon as pus can be detected, a free incision should be made. To do this properly, chloroform should be administered. Several incisions may be required to ensure free drainage. Antiseptic dressings should be applied. Healing will quickly occur, if the drainage is free. A nurse should never attempt to treat a suppurating breast alone. It is possible by prolonged poulticing to get the abscess to burst, but it will not drain properly, and the whole breast may be completely destroyed. Early and free incision is the proper treatment, and should be insisted on.

CHAPTER XXV.

ACCIDENTS TO THE CHILD DURING DELIVERY—ABNORMALITIES AND DISEASES OF THE NEW-BORN CHILD.

Fractures and Dislocations of Bones. — Fractures occasionally occur in the uterus before delivery, but in the majority of cases they are caused during delivery. Dislocation of one or both hips is sometimes congenital. The bones of the legs, arms and shoulder girdle are those which are most frequently fractured or dislocated, but the neck is sometimes fractured or dislocated in delivering an aftercoming head. The lower jaw, too, is occasionally fractured or dislocated in the same method of delivery. Fracture of the skull occasionally occurs, especially in difficult deliveries, through a contracted pelvis. Fracture of one or both thigh bones may take place when traction is made upon an impacted breech. One or both arms may be fractured in relieving the arms when the aftercoming head is impacted. In some cases one has deliberately to break an arm in order to save the child's life. The clavicle may be broken in making traction with the fingers over the shoulder.

The break in the long bones is what is known as a green-stick fracture. The bones are softer than in an adult and do not really break through, but bend, much as a stick of green wood does; *i.e.*, it is not a clean break with a separation of the parts, but a cracking of the bone. In the skull you may have a bending in of the bone where the promontory of the sacrum has pressed against it. This is what is commonly spoken of as a spoon-shaped depression of the skull. It may be on the frontal bone or further back on one of the parietals (Figs. 38 and 39). If

it has been caused by the pressure of the forceps, the bone may be actually broken and the brain lacerated.

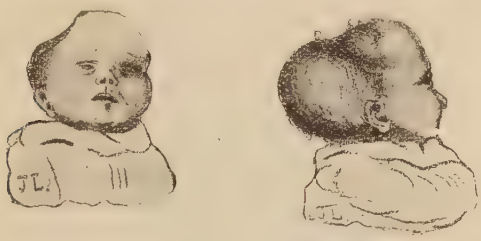

Fig. 47.—Depression of Skull—(*a*) Front view; (*b*) Side view.

Diagnosis.—In the leg, arm, or clavicle, you will probably be aware of a snap when the break occurs. After delivery, you will notice that the bone is bent, and that the child cannot move the injured limb as freely as the sound one. You will not get grating or crepitus as in a fracture in an adult. In the skull you will notice a spoon-shaped depression where the promontory has pressed against it, or a depression where the blade of the forceps has been applied. In the latter case, by pressing against it with your fingers you may feel that the bone is actually broken, and crepitus or grating will be felt.

Prognosis.—Fracture of a long bone is not a dangerous condition; neither is a spoon-shaped depression of the skull, unless it be a very large one; but a complete fracture of the skull is very likely to prove fatal, as the brain is almost sure to be injured.

Treatment.—The long bones should be straightened and bandaged. In the case of the arm it should be bandaged and then bound firmly to the chest. A long splint should be put on the leg. A spoon-shaped depression of the skull can often be relieved by compressing the head antero-posteriorly. The depression will rise, just as it does in a hard hat. If the bone is actually broken, compression of the head will do no good. If the case is left alone and

the child survives, the depression will lessen considerably, but it may remain fairly marked throughout life. The brain may suffer, and epilepsy or imbecility result. The depressed portion can easily be raised by operation, and this should be done at once, or within a few days of birth.

Fig. 48.—Deep depression of the left frontal bone, caused by the promontory. Relieved by incision and elevation.

In such a case the nurse's duty is to call in medical assistance; in fact, in any case of fracture, no matter which bone is involved, a nurse should not attempt to treat the case on her own responsibility.

Injuries to the Soft Parts.—The scalp may be injured when a sharp instrument is used to rupture the membranes when there are no forewaters. Occasionally the scalp is mistaken for the membranes, and a hole is made into it, but such a careless mistake should not be made. If the scalp is cut through, the wound will probably enlarge during the descent of the head and the scalp may actually be partly pulled off. If such an accident does happen the wound should be stitched at once.

In face cases the eyes may be injured in rough examinations. In delivery with forceps—which of course is not part of a nurse's work—one eye may be injured by the pressure of the forceps blade. The injury may be so great as completely to enucleate the eye, or to crush it so badly as to burst it. Pressure from the promontory in a contracted pelvis may also injure the eye seriously.

Hæmorrhages into the eyes under the conjunctivæ are quite common and are of no consequence, as the blood is quickly absorbed. Sometimes hæmorrhage occurs into the deeper parts of the eye. In difficult deliveries the cornea is occasionally affected. It becomes opaque, especially in a line up and down about the centre. This arises from the pressure either of the forceps or the promontory, causing a bursting of the posterior membrane of the cornea and allowing the aqueous humour to affect the corneal tissue. In severe cases the whole cornea may become opaque.

Injuries to Nerves.—The facial nerve is the one most frequently affected, by pressure of the forceps blade upon the nerve, close to its point of exit from the skull. The face will be twisted towards the sound side, and the child will be unable to close the eye. The facial contortion will be very marked when the child cries. As a rule, the paralysis passes off in a day or so, but it occasionally persists for some days.

The brachial plexus (the collection of large nerves which go to the arms) is sometimes injured when the shoulder is dislocated, but it may be seriously injured without any injury to the joint. This is most liable to occur in cases delivered by the breech. One or both arms may be paralysed, and the paralysis may remain more or less permanent. It is thus a very serious condition; the child will not be able to move its arm or arms freely. As soon as a nurse notices the condition she should call in a medical man, or send the child to hospital.

Hæmorrhage into the Brain or its Membranes.—This is apt to occur in fracture of the skull, but it may arise without fracture, in difficult deliveries, especially of an after-coming head in a contracted pelvis. If the bleeding is in any quantity, it will cause the child's death, but if it is small in amount, convulsions are likely to occur, and, if

the child survives, imbecility may not improbably follow. In many cases where, though the heart beats strongly for some time after delivery, yet breathing cannot be established, the cause of death is hæmorrhage into the brain.

Cephalhæmatoma.—This is a swelling on the part of the head which presented, and is caused by hæmorrhage beneath the periosteum, *i.e.*, between it and the bone. It is different from the caput succedaneum in that the swelling is not in the scalp but beneath it. It may be apparent at birth, but it usually forms shortly afterwards. There is usually only one swelling, but there may be two. It may be on either parietal bone or on both, or in some cases on the occipital bone. It may be as large as half an orange,

Fig. 49.—Cephalhæmatoma.

and it feels fairly soft. On examining it carefully you will find that it is confined to one bone, and is bounded by the edges of the bone, *i.e.*, it never extends beyond the sutures, because the periosteum is very firmly adherent at the edges. This distinguishes it from the caput succedaneum, as the latter, being in the scalp, is not influenced by the sutures. If there are two, they will be on different bones and quite separate.

The blood will gradually be absorbed, but it may be a week or two before this occurs. Pressure applied by means of a bandage will hasten absorption, but this is not necessary. If the scalp is injured, septic organisms may find their way in, and suppuration occur. In such a case, incision and free drainage is necessary.

Hæmorrhage into the liver sometimes occurs, especially in cases in which artificial respiration has been done by Schultz's method. The liver is a very heavy organ, and the strain upon its ligaments may rupture one of the vessels. In breech cases, one occasionally finds the scrotum become quite black from blood being effused into it. No treatment is required.

Laceration of Soft Parts.—The groin may be lacerated in delivering an impacted breech. The genital organs may be injured in rough examinations in breech cases and more than once the anus has been mistaken for an undilated os and attempts made to dilate it. In a female child the perineum has been completely torn into the bowel, but such an accident should never occur.

Abnormalities and Diseases of the New-Born Child.—There are many abnormalities, such as those arising from intra-uterine amputations, want of development of bones, or of the anterior wall of the bladder, etc., but we shall not attempt to describe these. We shall consider the commoner ones, such as club feet, imperforate anus, etc.

Club-Feet.—Normally, the feet are bent up upon the front of the legs during intra-uterine life, and this position is often quite apparent for a short time after birth. If it remains to a marked degree it gives one form of club-feet. Other forms of club-feet are also occasionally seen.

When club-feet are recognised, it is well to keep the knowledge from the mother for a time. By straightening the feet and massaging the muscles of the leg which are at fault, much can be done to correct the condition in the early days of life, as the parts are soft and mouldable. This should be done several times a day.

Imperforate Anus.—If the child's bowels have not moved within a few hours of birth, a careful examination must be made to see whether or not the anus is open. An external examination is not sufficient, as the obstruction may be half an inch or so up in the bowel. The little finger should be oiled and passed into the bowel. If the rectum is closed the obstruction will be felt just within the anus. If there is an obstruction it is plain that a dose of opening medicine should not be given to the child. An operation will be required, and the sooner it is done the better, so no time should be lost in getting medical assistance.

Difficulty of Micturition.—This is more frequent with male than with female children. In boys, if the foreskin is long and adherent, it may close the meatus and cause retention of urine or great difficulty in micturition. In some cases very little urine is excreted for the first few days, and what little is passed causes considerable pain. The kidneys are not acting well, and considerable uric acid has been deposited in the tubules.

Treatment.—Give the child hot water to drink, and ten drops of sweet spirits of nitre in water every four hours. To ease the pain and encourage micturition, give it a hot hip bath occasionally. In a boy the foreskin may require to be stretched or circumcision done, but a nurse must not attempt this.

Malformation of the Genital Organs.—The external genital organs of a boy are occasionally very like those of a girl. This condition is known as *hypospadias*. The scrotum is cleft, giving two folds exactly like the labia majora. The testicles, if descended, lie one in each of these folds, but they may not have descended. Instead of an ordinary sized penis, there will be a small imperforate one, which is exactly like a large clitoris. The urethral opening will be below this. There will be no vagina, but

the depression between the two sides of the cleft scrotum may mislead you, until you examine carefully, when you will find there is no canal. It is important for a nurse to be able to recognise this condition, as it is rather awkward for the child to be registered and brought up as a girl. The mistake may not be found out until puberty is reached. We recently saw a case where this mistake had been made by a very competent midwife, and, as the child had already been registered as a girl, it was necessary to go before the sheriff to have the registration altered. If you have any doubts in regard to the sex of the child, refer the case to a medical man.

Discharge of Blood from the Vagina.—This is occasionally seen in children. By some the discharge is said to come from the vaginal wall and not from the uterus. It ceases in a day or two and is of no consequence.

Blood sometimes comes from the bowels. If it is associated with the condition which is known as hæmophilia, it will be very serious. In such a case there will be hæmorrhages into the different tissues of the body, into the joints, etc., and death will result. In a case where there is no hæmorrhage into any other organ, the child will probably recover.

Engorgement of the Breasts.—This occurs quite as frequently in male as in female children. The breasts become swollen and hard, and milk can be expressed from them. It is a common practice among untrained nurses to squeeze the milk out of the breasts repeatedly with the idea of relieving the child. This should never be done as the gland tissue is liable to be injured, and suppuration will probably occur.

Treatment.—Place a pledget of wool over the breasts, and pin the binder firmly over this. The pressure will promote absorption. If suppuration occurs, the abscess must be freely opened.

Shortness of the Frænum Linguae.—In this condition the child is said to be "tongue-tied." When the tongue is badly tied the tip of it cannot be raised, and the child will have difficulty in sucking. The condition is not so common as some nurses make out, but it is occasionally seen.

Treatment.—The frænum should be cut with scissors and torn back with the finger nail. The bleeding is usually slight, and if the child is given the breast at once the pressure will control it.

Thrush.—The tongue and inside of the mouth sometimes become coated with a thick white fur. This is most frequently seen in bottle-fed children when the bottles are not kept clean. It is due to the growth of a white fungus (oidium albicans). It is apt to derange the child's digestion and bring on diarrhœa. In such a case the thrush is said to have passed through the child.

Treatment.—Apply glycerine of borax to the mouth and tongue, and give the child a few doses of magnesium, or of grey powder and bicarbonate of soda. Borax and honey is a common remedy, but the fungus grows well in honey and it is therefore not a good remedy. Care should be taken to see that the bottles are kept quite clean.

Digestive and Intestinal Disturbances are quite common in bottle-fed children. Lumps of undigested curd may be passed and diarrhœa often occurs. The stools may be greenish in colour.

Treatment.—A dose of castor oil should be administered to clear the irritating material out of the intestinal tract, and the diet should be regulated. If curd is being passed, the strength of the milk may require to be lessened by the addition of more water, or better, barley water. With diarrhœa, lime water should be added to the milk. In bad cases the milk may have to be peptonized for a time. Raw meat juice is useful in such cases.

If there is much disturbance, a nurse should call in medical assistance, and not attempt treating the case on her own responsibility.

Constipation.—Some infants are troubled with this. To be constantly dosing them with purgatives is not good treatment. Try to regulate the diet so as to get the bowels to move regularly. Malted preparations will often be found useful in such cases. Purgatives, such as castor oil or magnesia, may be given occasionally. A small piece of soap inserted into the rectum is a simple method of getting the bowels to move.

Colic.—Some children suffer greatly from flatulence and colicky pains. This is commonly known as wind in the stomach or bowels. It is very common in bottle-fed children, especialiy if they are allowed to take their drink too quickly, and are allowed to continue drawing at the bottle after it is empty. In some cases, however, it arises from fermentation in the stomach. The child will draw its legs up and cry with the pain. If it belches up wind, or passes flatus by the bowel, it will get relief.

Treatment.—Regulate the diet, and see that the child does not take its drink too quickly, and also that it is not allowed to suck the teat after the bottle is empty. Dill water and sugar of aniseed are useful remedies, and occasionally five drops of spirit may be given, but the latter should not be given frequently. In bad attacks of colic warmth to the abdomen will relieve the pain.

Jaundice.—A slight amount of jaundice is very common. As a rule, it passes off in a few days, but one occasionally sees a case where it is very marked. In such a case there is, probably, some disease of the liver, often syphilitic, which is not unlikely to prove fatal.

Treatment.—In slight cases a few doses of grey powder or other purgatives will clear the bile out of the system, but if the liver is diseased, no treatment will avail.

Affections of the Skin.—Among the poorer classes in Scotland there is a mysterious affection known as "Hives." "Hives" seems to be a most comprehensive term and

what its exact meaning is we have not been able to determine. If an infant develops a rash it is said to have "Hives," and again if it passes curd in its motions, or has diarrhœa, it is said to have "bowel hives." It seems to include all eruptions, syphilitic and others, and then there is the "bowel hives," but it is impossible to define what the term really means.

Erythema and Intertrigo.—Many infants are prone to irritation about the buttocks which may extend down to the thighs. The buttocks and thighs become angry and red in colour, and excoriations form in places. Every time the child passes water or the bowels move, great smarting is caused. The condition usually arises from want of proper care in changing the napkins and keeping the child clean, but it may occur even when the greatest care is taken, and then it will usually be found that the child is syphilitic. It is more common in hand-fed children than in those on the breast.

Treatment.—The greatest care must be taken to keep the child as clean and dry as possible. The napkins should be changed as soon as they are wet or soiled. Dusting powder should be freely used. Huxley's is one of the best to use. The child's bowels should be regulated and, in syphilitic cases, antisyphilitic remedies should be used. In such cases, calomel should be used with the dusting powder, but a nurse should not try to treat such a case alone.

Gum.—This is a common red rash in scattered spots. There is usually a small yellowish speck in the centre of the spot and a little pustule may form. It is a kind of acne. The glands of the skin have become irritated and inflamed, and the little yellow speck is the obstructed mouth of a gland. It is caused by improper clothing and too much warmth applied to a part of the skin, as the side of the face which lies next the pillow.

Treatment.—See that the child is properly clothed and kept clean, and apply a dusting powder, such as starch and boracic acid finely powdered.

Syphilitic Eruptions.—The commonest form of syphilitic eruption is a copper-coloured papular one, which usually begins about the buttocks, but may be all over the body. Fissures are liable to form about the anus and mouth, and there may be what are known as condylomata, *i.e.*, slightly raised mucous patches about the anus and genitals. The same kind of mucous patches may form in the mouth. The child will propably be puny, and it will have snuffles. Snuffles is usually one of the first visible indications of syphilis. The child is usually said to have a cold in its head, but if a copper-coloured eruption is present, you may be quite sure it is syphilis and not cold which is causing the snuffling. The eruptions usually show themselves within three weeks of the birth.

Treatment.—Antisyphilitic remedies should be used, but a nurse must not undertake the treatment except under a doctor's supervision. A syphilitic child should never be given to a wet nurse to suckle, as it will infect her.

Pemphigus Neonatorum.—This disease appears in the form of blebs of varying size. The blebs are filled with serum which quickly turns to pus. It specially affects the soles of the feet and palms of the hands, but may be all over the body and face. The blebs soon break and leave raw patches. If the patches are near the mouth or on the buttocks, or on the thighs, it will be impossible to keep them dry, and the child will suffer great pain. The onset may be within a day or two of birth, but the blebs are occasionally present at birth. Syphilis is generally the cause of the disease, but there is a non-syphilitic form which is usually slight, with only a few blebs in different parts of the body which soon dry up after they have burst.

It is a contagious disease, and may easily be carried by a nurse from one child to another. We know of a small epidemic where the contagion was evidently carried to several children on the attendant's apron. You must therefore be careful to guard against this. In bad cases the child will probably die.

Treatment.—The child must be nursed with great care. An antiseptic dusting powder should be used for the blebs. The medicinal treatment is for a doctor to attend to. In most cases, anti-syphilitic remedies will be required.

Affections of the Cord.—Hæmorrhage may arise shortly after birth, from the ligature slipping, or becoming slackened by shrinkage of the cord. Sometimes we get bleeding from the umbilicus after the cord has separated. In this case it will probably be due to septic infection, syphilis, or hæmophilia (the disease of bleeders).

Treatment.—Before the cord is dressed it should always be carefully examined, to see if the ligature is secure. If it is very thick, as is especially the case with premature children, or if the first ligature is slack, a second one should be applied nearer the body. When hæmorrhage does occur, a fresh ligature should at once be applied, and one would imagine any woman would have sense enough to do this; but such is not the case, so make sure the cord is securely tied before you dress it. When bleeding arises after separation of the cord, it is sometimes very difficult to stop it. A nurse should apply cold and pressure, and send for assistance. Various styptics, such as tannic acid, perchloride of iron, and supra-renal extract may be tried, but it will often be necessary to transfix the umbilicus with two needles and put a firm ligature round under them. In septic cases the part should be sterilized and dressed with an antiseptic dressing.

Septic infection of the Cord.—If the cord is not properly

dressed and cared for, it may become septic. It should dry up and drop off in a few days, but it sometimes becomes very foul and septic. At the point of separation there will be a foul smelling discharge and an area of redness round the umbilicus. This area may spread over the abdominal wall and even on to the front of the chest, and the whole of the skin be undermined with pus. It is erysipelatous in nature. In such a case the child will die of septic poisoning. The infection is likely to travel inwards along the vessels which are full of clot, and pyæmia may be set up. In most cases the area of inflammation about the umbilicus is comparatively small, and the risk to the child is not great.

Treatment.—When there is any smell arising from the cord, at once cleanse it very thoroughly with an antiseptic solution, dust it well with boracic powder, or iodoform, and put an antiseptic dressing on. If it is nearly separated, tie a ligature close to the skin and remove the cord. The redness and inflammation will usually subside in a day or so, but, if it is extensive, a nurse should send for assistance, as the condition is a very serious one.

Tetanus Neonatorum.—In tropical countries this disease is very common, but it is rare in this climate. It is the disease which is commonly known as *Lock Jaw*, and is caused by a bacillus—the tetanus bacillus—which finds its way into the child's system through the stump of the cord. This bacillus is often found in earth, and that is the reason why "lock jaw" so often follows injuries where earth has got into the wound, as in an injury to the foot from a dirty nail. In the Island of St. Kilda, which lies off the West Coast of Scotland, for many years nearly all the children born on the Island died from tetanus, within a few days of birth. In 1896 the late Dr. George A. Turner, of Glasgow, gave full instructions to the missionary on the island how to apply an antiseptic dressing to the cord, and since then no children have suffered.

The disease affects an infant in the same way as it does an adult, and will probably prove fatal. Not only is there locking of the jaws, but there are severe spasms and convulsions of the body.

Treatment.—Preventative treatment is the only thing that is of avail. At the birth of the child, the cord should be very carefully washed with an antiseptic solution, and should have an antiseptic dressing applied until it has completely separated. In tropical countries, or countries where tetanus is common, the cord should always be treated in this way. If a child has died of tetanus its clothes should never be used for another child. They should be burnt.

Ophthalmia Neonatorum.—In speaking of the care of the eyes in the new-born child we have already sufficiently referred to the disease. (See page 141).

Non-Closure of the Foramen Ovale. — At birth the opening between the right and left side of the heart should close, but occasionally this does not occur, and we then have what is commonly known as a *Blue Baby*. The blood is not being properly aerated, as most of it goes to the left side of the heart directly through the opening, instead of through the lungs. If the oxygen supplied to the blood is not sufficient to support life, the child will quickly perish, but in some cases the blood is sufficiently purified and the child lives for a time, though adult life is rarely reached. The extremities of such a child will always be blue and cold, and the child will be quite unable for any exertion.

Diagnosis.—The child, after it breathes, remains a dusky bluish colour, and its hands and feet are cold.

Prognosis.—If the foramen does not close within a few hours, the condition is hopeless, and the prolongation of the child's life is not desirable, as, if it lives, it will be doomed to a life of suffering. However, it must not be neglected.

Treatment.—If nature fail to remedy the condition, there is nothing you can do to assist, except to keep the child warm and lying perfectly quiet.

Spina bifida.—In this condition there is a cleft, in some part of the spine, from which a cystic swelling projects. The cyst consists of skin and the membranes of the spinal cord, and its contents of spinal fluid. It may be so pressed upon during delivery that it then bursts, or is so bruised, that it soon sloughs. In many cases, the child will be still-born, or will die shortly after delivery, but, if it is likely to survive, treatment should be adopted, so a nurse should call in assistance. She should dress the child and place it so that the sac has the least possible pressure upon it.

Convulsions.—When the mother has had eclampsia, convulsions occasionally occur in the new-born child. After difficult labours they are also sometimes seen. In the latter case, they are probably due to hæmorrhage into the brain.

Prognosis.—The condition is a very dangerous one. If the child survives, imbecility may result if there has been any injury to the brain.

Treatment.—Keep the child warm, and see that it is fed regularly, but be sure to get medical assistance.

Sudden Death of the Child.—Weakly children often die from non-expansion of the lungs, but one occasionally meets with a case in which an apparently strong child dies suddenly within a few hours or days of birth. Even after a careful post-mortem examination one may be unable to say what has caused the death. In some cases the thymus gland, which lies at the root of the neck in front, is found to be very large and pressing upon the windpipe, and this may account for the death. A perfectly strong child might easily be smothered or asphyxiated, if it were carelessly placed so that its mouth pressed against the

bedclothes or pillow. Among the lower classes lives of children are lost in this way by "overlaying" as it is called. It is generally the result of drink, the intoxicated mother either lying on her child, or so closely pressing it to her side as to smother it. A nurse should always see that the child is so placed that it can breath freely. If possible, the child should be in a cot of its own, and not in the bed with the mother.

CHAPTER XXVI.

INFANT FEEDING.

In his book on "The Feeding of Infants," Dr Cautley says, "Certain statements are so often made, and are based on such a large amount of facts and clinical evidence, that they may be almost regarded as axioms, and may be expressed in this fashion :—

"Axiom 1. 'Early mortality depends largely on diseases of the digestive organs.'

"Axiom 2. 'Every healthy mother contributes to the illness and death of her child by refusing to nurse it.'

"Axiom 3. 'Normal alimentation is especially important during the first few months of life, and for this period, at any rate, breast feeding must be insisted on.'"

These axioms show how very important it is, for every mother who is able, to nurse her child. This is what nature intended, and nature is not likely to have made a mistake. There are, however, certain conditions under which nursing would neither be good for the child nor for the mother, *e.g.*, as when the mother is too weak, or is suffering from severe constitutional disease, especially if it is of a tubercular nature. A tubercular woman should never nurse.

When the child is born there is not usually much milk in the breasts, but there is always a small amount of **colostrum,** which acts as a natural purgative to the infant. By the second or third day active secretion will be established in the breasts, and there should be plenty for the wants of the little one. Regularity in feeding must be insisted on from the beginning. With most children, every two hours during the day, with an interval of five or six hours at night, is

quite often enough. If it is a weakly child it may require it every hour and a-half. In a very short time it will come to recognise its proper feeding time, but if it finds that by crying it will get food, it will soon form a bad habit. This crying is not always due to the child being hungry, but very often from indigestion, the pain of which is relieved for a little by the warm milk it gets from the mother, only to become worse afterwards. As the child gets older, the intervals between the feedings must be lengthened. It should not be allowed to take its drink too rapidly, nor to fall asleep and lie with the nipple in its mouth.

A nursing mother must always bear in mind that she is bound to consider her child before everything else. She must, therefore, study herself as regards her diet, which must be simple and nourishing. All excitement must be avoided, or the milk will be so altered that it may have a very deleterious effect on the child.

We have already mentioned that menstruation is usually in abeyance during lactation, but this is not invariably the case. When it does occur, it sometimes affects the milk so as to cause it to disagree with the child. If this is very marked it may become necessary to wean the child.

Nursing should be continued for the first nine or ten months. In many cases the mother's milk will not be sufficient for the child's wants during the last month or two, so some artificial food will be required. Among the working classes, in many cases the children are nursed far too long. You sometimes see them as old as two years still at the breast. It is not good for the child, and it is certainly very bad for the mother. If the child is very delicate it may be necessary to continue it at the breast for a month or two longer, but it should never be continued beyond the twelve months.

Weaning.—As regards **weaning**, a time should be selected when the child is in good health, and it should

not be done in hot weather. In very hot weather the stomach and bowels are apt to be deranged by the artificial food, and fatal inflammation of the bowels may be set up. Weaning may be accomplished slowly, by lessening the number of drinks day by day, and increasing the artificial food, or it may be done suddenly. The gradual method is the better. A very good mixture to put it on is one of milk, cream, sugar, and barley water—2 ounces milk, 1 ounce cream, 1 lump of sugar, and 3 ounces barley water. If this does not satisfy it, you can give it an ounce or two more, but we shall have something to say later on about the proper food for an infant of nearly a year old.

Breast fed infants do not always thrive. There may be several causes for this on the part of the mother—from ill health, the breasts and nipples may be affected, the milk supply may be scanty, or in some cases the milk may actually disagree with the infant. The mode of life of the mother, and her mental disposition, may so affect the milk as to render it unfit for the child. Most of these defects may be remedied, provided the mother will devote herself to her child entirely, but if she will not do so, it will be better to wean it, in part, at all events.

If a mother is unable to nourish her child entirely, should she continue to do so in part? Most decidedly she should. It is a great mistake to imagine that the two forms of food will disagree. The artificial food may, but the mother's milk will not, in the vast majority of cases.

A wet nurse.—Now we come to consider a very important point. If the mother is unable to nurse, what is the best substitute? A wet nurse is undoubtedly the best, but it is one which only the wealthy can afford.

A wet nurse should be selected with great care. She should be a perfectly healthy woman, with well formed breasts and nipples, and a plentiful supply of milk. Her

own child should be near the same age as the one she is to suckle. There are two diseases which a wet nurse must be absolutely free from, viz., tuberculosis in any form, or syphilis. The presence of the latter is difficult to detect in some cases, but although the mother may show nothing there will probably be some manifestations of its presence in her infant. Her infant should, therefore, be very carefully examined as well as herself. If it is a puny, sickly child, even although it shows no signs of syphilis, the mother should not be engaged. If her own child is not thriving it is hardly likely that another woman's child will thrive on her milk.

A nurse should not take upon herself the responsibility of engaging a wet nurse. It is for the doctor to decide whether or not she is suitable.

The employment of wet nurses is becoming rarer and rarer. As they are a luxury that only the wealthy can afford, the vast majority of children who cannot be nursed by their mothers must be brought up by hand, so we must consider how this may best be done. We must find a substitute for the mother's milk.

Let us, for a few minutes, consider what the aim and object of dieting is. In the adult, the body requires a constant supply of material for various purposes, the chief of these being for repair of tissues which are constantly changing. We must have a constant supply to keep up secretions, as in digestion, and also fuel to be burnt up in the body to support heat and energy for every movement and action in life. In children, in addition, there is another great need, namely for the structure and development of new parts, as the child is actively growing. The tissues have to be kept in repair, just as in a full-grown person, but in addition, a child requires new building material, so to speak. It thus requires a more abundant supply of certain kinds of material than an adult.

Physiology teaches us that the essential elements of food are of five classes :—

1. The Nitrogenous, so-called because nitrogen enters largely into their composition. The chief of these are the Albuminates or Proteids, found most largely in animal foods. The best examples are albumen of egg, the casein or curd of milk, the syntonin of muscle, and the gluten of wheat.

2. The Hydrocarbons or Fats.

3. The Carbohydrates, of which starch and sugar are the chief forms.

4. The Mineral Elements—salts of lime, potash, soda, and iron.

5. The most general and largely used of all—Water.

To ensure perfect health, an adult must be fed on materials drawn from each of these five groups. He may get on for a time without one or other, but if deprived of any of them for any length of time his health will suffer. For perfect health they must be combined. The same holds good for a child. With a child, as with an adult, the **albuminate** or **proteid elements** rank first. Nitrogen is essential for every vital process in the body. Protoplasm, which is the centre of life and energy in every individual cell, is formed of nitrogenous matters and is nourished out of them. Nitrogenous elements are used for the building up of brain, nerve, muscles, and glands. It is quite clear, therefore, that these elements are of the utmost importance, especially for a growing child, not only to supply the waste of tissues, but also to build up new structures. If a child be deprived of nitrogenous food it will cease to grow, its muscles become flabby, and it will easily fall a prey to disease.

The second food element, **fat,** enters largely into many of the structures of the body, and is stored up in many parts of it. It serves as a fuel in the body, just as oil does

in a lamp, or coal in a fire, and it keeps up the animal heat. It is wanted for every tissue, especially for brain and nerve cells, and for marrow. If there is not enough of it in the food the bony structures grow slowly and are imperfectly developed. The deficiency of fat in the food is the chief cause of rickets, so common in Glasgow. In a cold climate much more fat is required than in a warm one.

The **starch** and **sugar** elements are largely converted into fat. They are not so essential as the preceding. The Esquimaux, for instance, get very little of them, as they live almost entirely on animal food. They may get a little in summer from berries, but that supply is necessarily very limited. Their children, of course, get it during infancy from the mother's milk. There is a considerable amount of sugar in milk—milk sugar—so it is a very necessary part of the food of an infant. There is no starch in milk, and this is an element which must not enter into the composition of a very young child's food. The reason of that is, because starch cannot be absorbed as starch, as a solution of starch has not the property of passing through an animal membrane. It has first to be converted into sugar. This is done by a ferment in the mouth, stomach, and small intestines. For the first few months of its life a child does not possess this ferment, therefore to give it starchy food is to supply it with a stone instead of bread. When it begins to get its teeth the power gradually comes to it. A child should not have any starchy food until it has got at least six teeth, and even then only a small amount should be given. This is the reason why all the artificial foods are malted, as they consist largely of starchy substances which are changed by malting them. This important fact is constantly ignored, among the working classes at least, as they are in the habit of giving corn flour, farola, etc., to their young infants. These things are easily prepared, and look bland and inviting,

but they only serve the purpose of irritating the stomach and intestines, as they cannot be digested.

The **mineral** elements are essential at all times of life, but especially so to a growing child, as they enter largely into the formation of the bones.

The last element, **water,** is a most important one. It is necessary for the solutions and secretions, and for building up new tissues, which consist of four-fifths of water.

Numerous experiments have shown that, in order to keep an adult body in perfect health, the various elements should be supplied in the following proportions :—

Proteids (Albumen, Casein, etc.),	5·00
Fats,	3·00
Carbohydrates (Sugar and Starch),	15·00
Salts,	1·15
Water,	75·85
	100·00

For a child the proportions are not the same. Human milk may be taken as the proper standard food for an infant, and, on analyzing it, it is found to contain approximately :—

Proteids,	3·500
Fats,	3·000
Carbohydrates,	4·000
Salts,	·138
Water,	89·362
	100·000

If we study these tables we see that the adult should get 5 parts proteid to 3 of fat, while the child should get $3\frac{1}{2}$ proteid to 3 of fat, *i.e.*, the **Proteid** and **Fat** in a child's diet should be nearly equal, instead of 5 : 3 as in the adult's. Roughly speaking, a tiny infant requires from a half to three-fourths as much **fat** in 24 hours as a full-grown man. The **proteid** element also requires to be much higher in

proportion to the **carbohydrate**—*i.e.*, they are nearly equal, instead of as 5 : 15. It is of the utmost importance to remember that the food of a child requires this large amount of fat. Milk is a rich emulsion of fat, but this is too often entirely forgotten, and children are constantly being fed on foods destitute of this important element.

So much for the elements, but there are certain other qualities necessary for healthy nutrition. If an adult is deprived of fresh vegetables, and is fed on salted meat for any length of time, he will be attacked by scurvy. As you know, this used to be very common amongst sailors at sea, and formerly wrought dreadful havoc among them. The anti-scorbutic element is contained in human milk, and a child on the breast will never get scurvy unless the mother has the disease. Fresh cow's milk contains it also, but condensed milk loses some of this property, and so does boiled milk to a slight extent. It is absent from all farinaceous foods.

The food must contain a large amount of animal matter. From a purely vegetable food sufficient proteid or fat cannot be obtained. A purely vegetable diet will cause a child to be anæmic, flabby, rickety, and scorbutic.

The food must also be in a condition in which it can be absorbed. The stomach of an infant is only designed to deal with the bland and easily digested mother's milk. It cannot deal with solid masses.

As regards the quantity of food a child requires, we may be guided to a certain extent by the amount of milk secreted by the mother. During the first few weeks of suckling the breasts yield about one pint of milk. This gradually increases, until, by the end of nursing, they will be secreting three pints. To begin with, a child should get the equivalent of nearly a pint of its mother's milk, and this should be increased. For the first month it should be fed every two hours, getting two ounces at a time.

After the first month, three ounces every three hours should be given. If it is not satisfied with this, you will have to give more. To a certain extent the child's stomach will regulate the amount by rejecting the surplus. To an infant, vomiting is not a disturbing occurrence as it is to an adult. The milk simply wells up without any discomfort. This is a merciful dispensation, otherwise there would be a vast deal of suffering among them, as the majority of hand-fed infants are allowed to take far too much at a time. The stomach of a new-born infant is a very small organ, and only holds about three-fourths of an ounce (less than two tablespoonfuls), when undistended.

Requirements of a Proper Food for an Infant.

1. It must contain the different elements in the proper proportions, as they are contained in human milk.

2. It must contain the antiscorbutic property.

3. The proper quantity for 24 hours must represent the nutritive value of from one to three pints of human milk, according to the age of the child.

4. It must not be purely vegetable, but must contain a large quantity of animal matter.

5. It must be in a form suited to the digestion of the infant, and at a suitable temperature (100 degrees).

6. It must be fresh and sound.

Cows' milk is what is usually substituted. It fulfils all the conditions as regards containing the different elements, it is an animal matter, and also has the antiscorbutic property. The pure milk contains a great proportion of the elements, especially of the proteids. There is, however, this drawback, and a very serious one it is, viz., that it forms a very much denser curd than human milk, so that the stomach of the infant is unable to deal with it in an undiluted form.

Goats' milk is sometimes used, but its curd is denser than that of cows', so it is even less suitable.

Asses' milk forms a very light curd, and it is very suitable for delicate children. The elements in it are in less proportion than in human milk, except the sugar, which is greater. Asses' milk is difficult to obtain, and is therefore little used.

To obviate the difficulty regarding the density of the curd, cow's milk is given in a very dilute form, viz., one part milk and two parts water. This reduces all the elements very much, so that to get the proper amount the child would require to take nearly three pints of this mixture in twenty-four hours, which is far too much. As a matter of fact, many children do very well on from 1 pint to 1¼ pints of this for the first month, and then the water element can be decreased gradually. The carbohydrate or sugar element is always increased by adding sufficient sugar to make the mixture sweet. Milk sugar is the proper form to use, but ordinary cane sugar does very well. The other elements can also be increased. For the proteid elements raw meat juice* can be added, and for the fat we have an excellent substance at hand, viz., cream, which is almost pure fat. Sometimes cod liver oil is used, if cream cannot be obtained, but if you can get milk you can generally get cream.

As we have already said, the massive curd of cow's milk is the one great drawback to it. Diluting with water does not overcome this satisfactorily, but there are other expedients. By some authorities boiled milk is said to give a less dense curd than unboiled. If barley water be added instead of ordinary water the curd is much lighter.

* Raw Meat Juice.—Scrape with a fork, or mince very finely, about quarter of a pound of best rump steak, and put it in a cup: add enough cold water to cover it. Let it stand for half-an-hour, and then squeeze it through fine muslin. A teaspoonful of the juice may be given alone, or along with the milk. It will not keep fresh long, so must be made at least twice a day. A pinch of salt may be added to the water. It must not be heated.

Lime water has the same effect. The addition of lime water is very necessary for another reason, viz., to render the milk alkaline to correspond with the mother's milk. Cow's milk very quickly becomes acid. Bicarbonate of soda is sometimes used for the same purpose, and it also makes the curd lighter, but it should not be used to any extent, as it may have a very injurious effect on the child's digestion.

By peptonising the milk the curd is got rid of entirely, but this is a form which should only be used in an emergency, and not for any length of time, because if you predigest the food the stomach will lose from disuse the power of doing its work properly.

Condensed milk, when properly diluted, gives a very fine curd. Many children are brought up on it, and some of them get very fat and thrive well, but as a rule it is not a good form of food. It is deficient in fat and has far too much sugar in it, while the antiscorbutic property is wanting. Another drawback is that different tins of it vary very much in composition, and it is too often made from skim milk. It is useful on sea voyages. Condensed skim or separated milk should never be used. The fat is practically all removed from it, and it is therefore absolutely useless as a food for an infant.

The order in which these different mixtures may be ranked as regards the digestibility of the curd is—

1. Peptonized milk (only to be used in an emergency).
2. Cow's milk, with barley water.
3. Cow's milk, with lime water.
4. Condensed milk.
5. Cow's milk, with bicarbonate of soda.

How to Prepare the Food.

First, a word about "one cow's milk," which many dairies

advertise. Milk from one cow is all right, if you are living in the country, and know about your cow. Some cows give much richer milk than others, and it will be all right if the cow happens to be a good one, but the chances are just as great that her milk may be poor. It is far better to take milk from the ordinary mixed milks, as, at all events, it will be sure to be an average milk. If the cow is kept in the city, you had better not have anything to do with the milk.

We speak about getting pure milk, but from a bacteriological point of view, probably there is no such thing as absolutely pure milk supplied. You are all familiar with the ordinary methods of milking, which is usually done in a more or less dirty byre. Milk is one of the finest media we have for micro-organisms to grow in, and it is frequently the source of disease. It will not keep sweet for any length of time. Changes begin in it as soon as it is exposed to the air. All milk contains numerous micro-organisms. There are numerous different species of milk bacteria. Many of them produce a mature growth in 20 minutes, which, in turn, produces its family 20 minutes later. They quickly give rise to changes in the milk, as souring and curdling, and render it unfit for a child, as it will derange the stomach, and set up severe diarrhœa and vomiting Deleterious changes may take place in it which cannot be detected by taste, smell, or sight. The milk may contain the germs of scarlet fever, typhoid, diphtheria, or tuberculosis. Some method must be adopted, then, to prevent, or at all events, minimise the risks. There are three chief processes:—

1. **Pasteurization.**—This process consists in raising the milk to a high temperature—70° C. or 158° F.—and keeping it at this temperature for at least half an hour, and then cooling it down rapidly. There are various different forms of apparatus for doing this. It can easily be done with an ordinary saucepan, the milk being placed in a clean bottle stopped with cotton wool. The pan is filled with water

as high up as the milk in the bottle. It is placed on the fire and heated until the water reaches 155 F., at which temperature it is kept from 20 to 30 minutes, and then cooled rapidly.

2. **Boiling** the milk is a simple method. It should be placed in a clean saucepan, and brought to the boil. It should be kept in a cold place, preferably in a refrigerator, and carefully covered up. A very good plan is to place each meal, mixed in proper proportions, in a clean soda water bottle and plug it with clean cotton wool. Several of these can be prepared at once. They should then be placed in a wire stand, which will keep them off the bottom of the pan, which is filled up to the necks of the bottles. The whole is boiled for half-an-hour, and then taken off the fire and allowed to cool. The bottles should then be put into a refrigerator. If you put them into the refrigerator hot they will likely burst.

There are certain objections to boiling the milk. It alters the taste and smell (but if the child has never had anything but boiled milk it will not object). It coagulates to a slight extent, and thus a small proportion of the nourishment is lost. It forms, according to some authorities, a finer curd than unboiled milk, which is a distinct advantage.

3. **Sterilization** by steam is the third method. The milk, contained in suitable bottles, is subjected to the influence of superheated steam for 20 or 30 minutes. There are numerous sterilizers on the market. Some of them are devised so as to sterilize each meal separately in a bottle of its own, doing a sufficient number for the day at once. The food is heated when wanted, and given directly from the bottle.

Pasteurized or sterilized milk is now sent out by some of the dairies, in hermetically sealed bottles. For safety to the child, then, it is necessary either to **boil, sterilize,** or

pasteurize the milk. Boiling it is the easiest method of all, and the one that can be carried out under any circumstances.

For a new born infant the proportions are:—one part of milk, two parts of water, which should have been boiled, and a little sugar—milk sugar is the proper kind, but cane sugar does well enough. This is given slightly warmed. A little lime water should be added to each portion, so as to render it alkaline. If *barley water is used instead of plain water it makes a better mixture. This mixture, as we have already seen, is weak in all its ingredients. To overcome that, cream mixtures are used, so as to increase the amount of fat which is so essential. Instead of this, the following mixture may be used:—boiled milk, 1 tablespoonful; cream, 1 to 2 teaspoonfuls; boiled water, or barley water, 2 to 2½ tablespoonfuls; sugar, 1 small lump; lime water, 1 teaspoonful. The lime water should not be boiled, but should be added when the milk has cooled down. If the child is not satisfied it should have more of the mixture, in the same proportions. After the first month, the amount of milk and cream should be increased and the water gradually lessened.

Cream Mixture, ready prepared, can be got from some of the dairies. It can be easily prepared at home. Take one pint good milk and add an equal quantity of water, strain and put in a clean dish with a tap, or a small hole with a cork in it, near the bottom: let it stand for an hour in summer and two hours in winter: then draw of the lower half. What is left will contain the cream. It should be boiled, and before feeding you add a little lime water and sugar. If it is found too rich, it should be diluted further.

What is known as **artificial human milk** is now being supplied by some of the large dairies. It can be made at

* How to Prepare Barley Water.—Put a teaspoonful of well crushed barley, or of washed barley, into a jug, and pour on it half a pint of boiling water. Stand it by the fire for an hour, stirring it frequently, then strain through muslin. It should be made twice a day.

home quite easily. Let the milk stand until the cream has risen, then skim the cream off. Divide the skim milk into two equal portions, and to one of these add sufficient rennet to curdle it. Strain the whey from the curd, then mix the whey, the skim milk, and the cream together. The curd is thrown away. This mixture is easily digested, as it only contains half as much curd as ordinary cow's milk, but it is not identical in quality with human milk, as there is too little proteid. It does not keep long, so should be freshly prepared daily.

There are different forms of **bottles** used for administering the food. The one most usually employed has a long tube, but it is a very bad form. It is most difficult to keep clean, and there is always a temptation to leave the child in its cot with the bottle by its side, with the result that it will greedily empty it, and then go on swallowing air until the stomach is over distended, and a bad attack of colic will follow. The best form of bottle is one in which the teat is slipped on the end. It is easily kept clean, and the child must be held on the knee while it is taking its drink. The bottle should be tilted sufficiently to keep the teat full and not to allow of air being swallowed, and as soon as the drink is finished the teat should be taken from the baby's mouth. The bottle should then be thoroughly washed and kept standing in a soda or boracic acid solution. At least two bottles are necessary. It is of the utmost importance to keep them perfectly clean. If the least quantity of sour milk is given to the child, fermentation will be set up in the stomach, and an attack of inflammation be brought on. In hot weather it requires very great caution to avoid this. A so-called "pacifier" should never be given to a child to keep it quiet.

Besides cow's milk there are many other forms of artificial food used, and some of them give excellent results. Many of them are purely vegetable, and for that reason they should

never be used alone. Only those which are made from, or are to be added to, milk should be used. They do admirably after the first few months. When a child has cut a number of its teeth a certain amount of starchy food can be given to it once a day, such as boiled bread and milk, or finely made, well boiled porridge. When it comes to be about a year old, it may have porridge and milk in the morning, and at noon mashed potatoes and gravy, occasionally beef or chicken tea, soft boiled egg, or milk pudding, and of course milk to drink with some barley water. For its afternoon meal, bread and milk, or bread and butter. At bed time, milk and biscuit, or perhaps porridge again. After 18 months of age it may have a little meat or fish, and a little cocoa may be added. Milk should enter largely into the diet of a child for the first six or seven years at least. There is nothing better than porridge and milk for the breakfast of a growing child. The food should be given at regular and stated intervals, and eating at odd times should not be allowed.

Fruit such as the pulp of grapes may be given to a year-old child, and a little later on ripe cooked or uncooked simple fruits are beneficial. Green or over-ripe fruit should never be given. As regards sweets, the fewer children have the better for them. Stimulants should never be given unless in a time of illness, when ordered by a doctor.

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